DOCUMENT RESUME

ED 347 384 CE 061 652

AUTHOR Cantor, Jeffrey A.
TITLE Apprenticeship and Community Colleges: Collaborations for Tomorrow's Workforce. A Final Report of a Research Project.
SPONS AGENCY City Univ. of New York, Bronx, N.Y. Herbert H. Lehman Coll.
PUB DATE 92
NOTE 253p.
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC11 Plus Postage.
DESCRIPTORS *Apprenticeships; Boat Operators; Building Trades; Case Studies; *Community Colleges; *Cooperative Education; Cooperative Programs; Corporate Support; Economic Development; Education Work Relationship; Electricians; Emergency Medical Technicians; Fire Fighters; Futures (of Society); Inplant Programs; Job Skills; *Job Training; Labor Education; *Labor Force Development; Manufacturing; Maritime Education; Models; Program Effectiveness; School Business Relationship; Technology; Two Year Colleges; Unions; Vocational Education; Work Experience
IDENTIFIERS Tech Prep

ABSTRACT

This monograph focuses on job training delivered through employer-sponsored cooperative apprenticeships with the community college. Following an introduction, chapter 2 looks at job training and cooperative apprenticeships, including recent legislative efforts to promote linkages and cooperative apprenticeships through tech prep initiatives. Chapter 3 discusses the community college, long in the business of serving the community and its economic needs and affairs. Chapter 4 reviews the issues of community economic development and associated issues and relationships of job training as provided by the community college. Chapter 5 describes the case study method used to identify and review factors influencing successful cooperative apprenticeship linkages and presents an overview of the programs reviewed and analyzed: (1) the automotive industry, including professional association groups, manufacturers, and dealerships; (2) electrical and construction labor union sponsored programs; (3) the maritime industry and U.S. government; and (4) professional firefighters and emergency services personnel. Chapters 6-9 analyze the data uncovered relating to the four programs and their uses of cooperative apprenticeships for training and human resource development. Chapter 10 describes a model for cooperative apprenticeship between business and industry, labor, government, professional organizations, the community college, and the local community. The report includes 14 figures, 6 tables, and a 104-item bibliography. (YLB)

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Apprenticeship and Community Colleges: Collaborations for Tomorrow's Workforce

A Final Report of a Research Project

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This monograph was researched, written, and printed in part with funds made available by grant from The PSC-CUNY Research Program, the City University of New York, 1991-1992 Competition Program.

CE 061 652

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Preface

This monograph is about apprenticeship. It is more specifically about apprenticeship and higher education. Apprenticeship as a formal method of training is not new. However, as a process for delivery of skills and knowledge in cooperation with institutions of higher education it is a new concept.

If we as a nation are to survive as a free world super-power we must rejuvenate our system of education. This educational system must be operated in cooperation with our economic system in order to ensure appropriately trained and educated workers and citizens.

As will be presented in this monograph, several industries, employers, employer organizations, governments, professional groups, and organized labor unions have proven that cooperative apprenticeship does work, and does provide upward career mobility in a unique, socially acceptable, and cost-effective way.

Contained herein are descriptions and discussions of several programs of cooperative apprenticeship, including automotive manufacturers, electrical and construction unions, maritime programs, fire and emergency services, working with institutions of higher education. This joint effort provides requisite job skills training and the higher education necessary for successful worker careers into the next century. Suggestions for program replication elsewhere is also provided.

Acknowledgements

The author wishes to thank his wife Ruth Cantor for her dedication to this project. She served in many capacities over the course of the two years of the research and writing. Ruth was an investigator, collaborator, writer, data processor, and colleague. Without her at his side, the work could not have been done.

JAC
Danbury, Connecticut
7/23/92

Chapter 1

Introduction

This monograph is written at a most interesting time period in American history. We have embarked into the last decade of the Twentieth Century -- and in just eight years will be in the Twenty-First Century. We are a high technology information-based society -- yet we recognize the critical literacy problems facing our workers. The pool of American workers continues to decline, but the attractiveness of America still draws significant numbers of immigrants to our land to work and partake of our enviable lifestyle. With this new worker population comes new problems and challenges to workforce training.

The directions we take as training and development professionals to meet these challenges will in major part dictate our position in tomorrow's new world political order. Will we continue to be recognized as the single great power in the world? Or, will we become dependent upon others for our goals and services? We have the training know-how to maximize our available human resource potential. Herein, I will discuss and describe one process -- <u>cooperative apprenticeship</u> -- and its unique ability to catalytically link organizational resources to effect training.

The arguments promoted herein are an outgrowth of the findings of a two-year study of linkages of business and industry and community-technical colleges via cooperative apprenticeships.[1]

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[1]. This study was funded in part by a PSC-CUNY Research Grant, funds made available through collective bargaining by the Professional Staff Congress of the City University of New York for the faculty of CUNY. This grant was No. 661248.

Used increasingly over these past several years, cooperative apprenticeship training provides a worker access to employer-sponsored post-secondary school degree-earning technical education. In turn, these cooperative ventures promote local economic development initiatives by preparing workers for existing jobs, when and where needed by the employer.[1] Recent Federal legislation in vocational education provides financial support and guidelines for development of these kinds of cooperative employer-community college (Tech-Prep) partnerships.[2]

Apprenticeship as a formal method of training is not new. In fact it dates as far back in history as the Babylonian Code of Hammurabi. However, apprenticeship as an instructional process in higher education is currently not universally accepted despite its unique contributions. In fact while apprenticeship training in the United States dates back to pre-American Revolutionary days, during recent years we have witnessed a proliferation of literature calling for consideration of a dual system of education such as the German system.[3] This dualism is, of course, inconsistent with our way of life and with our firm belief that all can "rise to the top" of their chosen field given the drive, desire, and hard work. Can cooperative apprenticeship succeed within our American system of education? Yes! As will be presented herein, several industries, employers, employer organizations, governments, professional groups, and organized labor unions have proven that cooperative

apprenticeship does work, and does provide upward career mobility in a unique, socially acceptable, and cost-effective way.

Definition of Apprenticeship

The term cooperative apprenticeship as used in this monograph is a form of structure workplace training in which: (1) an industry, employer, employer group, labor union, or other formal community or work-based organization joins with a community college to provide formal instruction in which a structured work-based experience is an integral part of the instruction; (2) an apprentice agrees to work for the employer for a specified period of time; (3) the employer agrees to provide structured and formal training in a specific field or trade over a defined period of time; and (4) the employer provides continued journeyman level employment after the training is successfully completed. This work-based experience might be termed "cooperative apprenticeship," or alternatively, "cooperative education," or "internship." In any event, it is an apprenticeship experience in structure.

Historically, apprenticeship was controlled by the craft guild or organized labor in the United States. In fact, today many large apprenticeship training programs are still sponsored by organized labor, including programs sponsored by the International Brotherhood of Electrical Workers (IBEW) and the International Union of Operating Engineers (IUOE), which will be analyzed herein. Both of these unions offer dual-enrollment opportunities towards Associate Degrees with community colleges.

Why have both employers and organized labor become concerned about a worker's need to acquire higher education? First, business and industry as well as organized labor continue to seek more effective and appropriate means for attracting, training and educating a 21st Century workforce. This concern is underscored by the changing worker demographics, a shrinking pool of workers from which to draw, and an all too severe literacy problem among American workers.[4] Additionally, and very significantly, increasing workplace technological requirements are mandating an equivalent of a minimum of two years of post-high school education and training for the majority of tomorrow's workforce.[5]

The Cooperative Apprenticeship

Why a cooperative apprenticeship? Many of the criticisms aimed at the American system of education center upon education's inability to educate and train to business' needs and standards. More often than not, it would appear that business and education, and our American economic system itself, work at cross purposes. Apprenticeship, as an industry-designed and delivered instructional tool in partnership with educational institutions, provides a cost-effective remedy to this problem and concern. The employer controls the content of training, and is given instructional assistance as well as other needed support by the community college. This assistance, as will be discussed and described herein, can be in the form(s) of: (1) instructors and instructor development; (2) trainee screening and/or recruitment; (3)

remediation of a trainee's basic skills; (4) shared facilities; (5) shared or donated equipment; (6) college credit granted for the related education and training, and/or "hands-on" portion of the apprenticeship; (7) technical consultation and assistance in business and/or technical matters; and (8) access to external sources of program funding -- badly needed resources for today's business.

Tech-Prep and Cooperative Work-Based Instruction

The Carl D. Perkins Vocational & Applied Act Amendments of 1990 provides a framework for reshaping post-secondary vocational education. Tech Prep, as it is termed, is a program area in the Perkins Act which encourages the articulation of secondary school programs into community college programs to effect a coordinated 4-year training program. These Tech Prep programs should be delivered together with work-based and employer-sponsored experiences.

Three systems, which operate traditionally at cross-purposes, and which are critical to effective work-based instruction, must now work in a coordinated fashion to make this kind of articulation successful. These three systems are: (1) the employer system; (2) the community college education system; and (3) the economic system.[6]

The employer system is a critical element of articulation. Apprenticeship delivered cooperatively by the employer and the second system, the community college education system, provides for

structured work-based learning. This permits the learner a real orientation to the job or occupation. The third system, the economic system benefits in-kind by participation of employers who gain trained employees, when and where needed. The end result is a community which has viable business and industry and reflects a high rate of employment for its citizens.

The following provides an overview of these three systems which are critical to a coordinated and structured process of cooperative work-based learning by apprenticeship.

The Employer System

Certainly out front in the pursuit of skilled workers is the employer -- though not often willing to invest large sums of capital into training. American business is faced with a number of economic, political, and sociological realities. These are: (1) increasing numbers of business failures due to rising costs to do business; (2) lack of available and trained human resources to support business and industry needs, when and where such needs exist; (3) inadequate training and educational systems to support human resource development needs; and (4) a faltering interest in support of the organized labor movement on the part of the worker. Apprenticeship is a prime example of a cooperative effort by industry, employers, and often organized labor to solve their mutual needs for skilled workers.

Organized labor. Organized labor is an integral part of the employer system. Labor unions have a long-standing interest in

apprenticeship, and in fact, have kept this form of training alive over a 200 year history.[7] Glover cites a consistency of purpose between labor's interests and that of employers advocating the use of apprenticeship to provide broad and transferable training, thus maximizing a worker's service and earnings power over a career span.[8,9] Cooperative apprenticeship satisfies some very important union objectives, the most important being the ability to control craft competence and productivity. From a collective bargaining perspective, uses of corporate investments in job skills development is a form of job security. By controlling the kinds of training, degree of specificity, and numbers of trainees, unions maximize their ability to attract and maintain contracts and keep their members versatile and adaptable to work changes.[10] It also serves to prevent substitution of low-wage workers for journeyman workers. Dual-enrollment programs with community colleges also have become training grounds for tomorrow's union leaders.[11]

Organized labor's interest in dual-enrollment processes for apprentice training in cooperation with community colleges dates back to the mid-1970s, with programs developed nationally by IBEW, and IUOE.[12,13,14]

The Community College Education System

Public education has certainly come under fire in recent years. Criticism has included an inability on the part of public schools to adequately educate youth for work and life. In the areas of job training, criticism includes inadequate job

preparation skills, lack of literacy in general, and an inability for educators to work with, or relate to local business and industry.

Some of this criticism is also levied at community colleges. While working more closely with local industry, some programs do tend to lose contact with the state-of-the art, and become outdated losing its ability to prepare competent workers.

Recent legislation, and specifically the new Perkins Technology Education Amendments Act is aimed at improving collaborative efforts between the community college and industry. The community college education system, working in concert with both the employer and economic systems, can make a difference in job training and business climate outcomes.

The Economic System

A third, and often unpredictable system at work which interacts with both business (and organized labor) and the community college is the economic system. All too often jobs fail to exist, for which the community college prepares trainees to work upon their graduation. Or, they disappear due to lack of business while trainees are in formal schooling. Unpredictable and uncontrollable economies make manpower development and training an imprecise science at best. Cooperative apprenticeship offers a solution by permitting the employer to place the trainee at an existing job requirement, and train that person "on-the-job" to requisite specifications. Organized labor also benefits from such

a relationship. From an economic development perspective, a gainfully employed trainee filling a current job requirement, and at the same time gaining education for tomorrow's career needs, is an optimum situation. These interorganizational arrangements covering job training and economic development have the potential of bringing together these three traditionally conflicting systems -- the employer system; community college education system, and the economic development system (see Figure 1-1).

Insert Figure 1-1 about here

The Community College

Community colleges are unique institutions of higher education. They have the ability to design customized job training programs to the specifications of a firm or business; thus they are capable of meeting varying needs of a community's business and industry, and simultaneously providing economic development support to their communities.[15]

As we approach the Year 2000, 75 percent of all job classifications will require 2 years of post-secondary education -- best delivered by the community college.[16] Labor, business and civic leaders continue to seek out the community college to design curricula to link labor's needs and the world of work.[17]

Community colleges have played a role in supporting employer job training and apprenticeships for some time. Many, if not all

community colleges provide related trades training for employers. Many do so on-site at employer plants and factories. Some community colleges provide services as a contract training agency to a local Private Industry Council (PIC) under the Job Training Partnership Act (JTPA), underwriting a performance-based contract for a trainee at a specific employer.

Community colleges have also been active in the apprentice training field for some time. While generally providing related classroom training, some have also designed programs to meet the increasing technological needs of the firms and industries they serve, as well as providing apprentice workers the higher education backgrounds (and in some cases basic skills education) which these workers will need. Many offer specific associate degrees for an apprentice. Some award credit for hands-on apprenticeship work. Some tailor related theory -- and even liberal arts and sciences courses to the trade or occupational program.[18]

Community colleges also provide support and outreach for the apprenticeship program. Recruitment of potential students through high school pre-apprenticeship programs is reported, as is developmental education, financial aid packages, operation of special facilities such as training centers, and technical consultation. These activities are becoming more commonplace. An individual state's system of organization for adult and vocational education will often dictate the degree of involvement and approach taken by the community college to support employer job training and

apprenticeship. States such as Maryland, North Carolina and California have very effective and proactive models in place.

While partnerships with community colleges to support apprenticeship training is not new or unique, organized labor and professional industry groups are beginning to recognize that the Associate Degree is a basic necessity in many high-technology fields. The union is also recognizing that higher education will aid the worker in being a better and a more productive union member. As I will describe herein, organized labor unions such as the IUOE, IBEW, and IAFF are major supporters of credit earning apprenticeship training in cooperation with community colleges. Industry groups representing the automotive industry are also leaders in cooperative apprenticeship with community colleges.

Lastly, from an enrollment perspective community colleges are realizing the benefits to be derived from working with business and industry and labor through cooperative apprenticeship.[19] Generally, such programs run an average of three academic years, and enroll better-than-average class sizes.[20] Industry and labor generally assist the college in staffing the programs; in the planning and development of technical courses; and provide specialized equipment and materials. Colleges thus have an opportunity to operate state-of-the-art programs for little capital outlay.[21] Herein is the quid pro quo.

The Federal Government's Leadership Role

As was stated earlier, apprenticeship is not new. What is new is the recently revived policy interest at the Federal level to support cooperatively sponsored apprenticeships with business and industry and the community college. Federal incentives aimed at making this happen appear in legislation including: (1) The Job Training Partnership Act; (2) the Carl D. Perkins Vocational and Applied Technology Act Amendments of 1990; and current legislative initiatives known as the Community College Technical Education Act. All of these pieces of legislation recognize a need for business and industry; (i.e. the employer), to become the driving force for the kinds of job training a community offers its citizens. As Van Erden (1991) writes, "Apprenticeship programs depend on the cooperation of private sector organizations that control jobs (p. 32)."[22]

This legislation now needs to be translated into action (hence a catalyst) at the local level as employers become aware of the mechanisms needed to make cooperative apprenticeship happen for them. Again, cooperative apprenticeship is beginning to emerge in training.

The Study

While the concept of cooperative apprenticeship is not new, what has been learned is that cooperative apprenticeship is a catalyst for bringing together the three systems at work, and provide new resources to cooperatively educate and train workers in

our American economic system. The monograph describes what has been found to work, and why, and how these results can be replicated elsewhere by employers, industries, organized labor, and community groups in partnership with local community colleges.

Specific research questions posed were:

1. To identify cooperative apprenticeship programs that successfully link industry groups, employers, professional organizations, and organized labor for job training with the community college.

2. To identify factors that promote these inter-organizational partnerships; and

3. To develop recommendations and guidelines to promote cooperative apprenticeship in partnerships between industry groups, employers, professional organizations, organized labor, and the community college.

The Case Study Method

A case study method was the research process of choice for this study, systematically identifying and reviewing factors influencing successful cooperative apprenticeship linkages.

The case study method was drawn around a hypothesized linkage model (see Figure 1-2) developed from a review of the literature in apprenticeship as a training process, as well as my past work in interorganizational collaboration and linkage. This method permitted the phenomenon of interorganizational collaboration (for

achieving linkage) to be studied in context, thereby highlighting the actions and interactions that resulted.

Insert Figure 1-2 about here

Data collection. The data was collected from a variety of sources. Programs looked at included: (1) the automotive industry including professional association groups, manufacturers, and dealerships; (2) labor union sponsored programs; (3) the maritime industry and the U.S. Government; and (4) professional firefighters and emergency services personnel. Each cooperative apprenticeship program constituted a "case" and involved an in-depth review, including analyses of records, descriptive literature, and interviews with employers, apprenticeship program operators, union personnel, as well as community college administrators and others (in person and by phone).

Strategy for conducting cross-case analysis. Although individual case studies provide valuable descriptions of a particular phenomenon, the ultimate purpose of the study was to produce a cross-case analysis (see Chapter 5). The entire "pattern" of each case's experiences were matched to one of the hypotheses that emerged as the study progressed. In this manner, each case was used as if it were a single study (not unlike a single experiment or a single survey), and the multiple cases were matched repeatedly to the same set of theoretical concerns.

Through these data analyses, the reasons for successful cooperative apprenticeship program implementation was sought. Potential barriers were specifically looked for. Areas of cooperative apprenticeship program review included:

a. actual cooperative apprenticeship program development and implementation;

b. organizational configurations and problems, including long-range planning; and firm/organization operating procedures;

c. legal semantics and interpersonal problems between community colleges, local and state governments and the firm(s)/industry(ies);

d. budgeting methodologies and concerns for business;

e. college credit for "on-the-job" apprenticeships, which cost the employer money and are not directly related to job training;[23] and

f. other factors identified as the study progressed.

The Report - An Overview

The following chapters describe the issues forming the conceptual basis for the study. Chapter 2 looks at job training and cooperative apprenticeships including recent legislative efforts to promote linkages and cooperative apprenticeship through Tech-Prep initiatives. Chapter 3 analytically discusses the community college -- a uniquely American institution -- long in the business of serving the community and its economic needs and affairs. Chapter 4 then reviews the issues of community economic development and associated issues and relationships of job training as provided by the community college. Chapter 5 presents the study methodology and an overview of the programs reviewed and analyzed.

Chapters 6 thru 9 each analyze the data uncovered in this study, relating to each of the fields, industries, governments, professional groups, etc., and their uses of cooperative apprenticeships for training and human resource development. Finally, Chapter 10 pulls it all together, describing a model for cooperative apprenticeship between business and industry, labor, government, professional organizations, the community college and the local community. Cooperative apprenticeship offers much promise as an instructional methodology for business and industry, and as a catalyst for promoting a community's economic development and business climate. Thus, this study is a first step at making this happen on a grand scale. Happy reading.

Figure Caption

Figure 1-1. Three traditionally conflicting systems.

THREE TRADITIONALY PARALLEL SYSTEMS

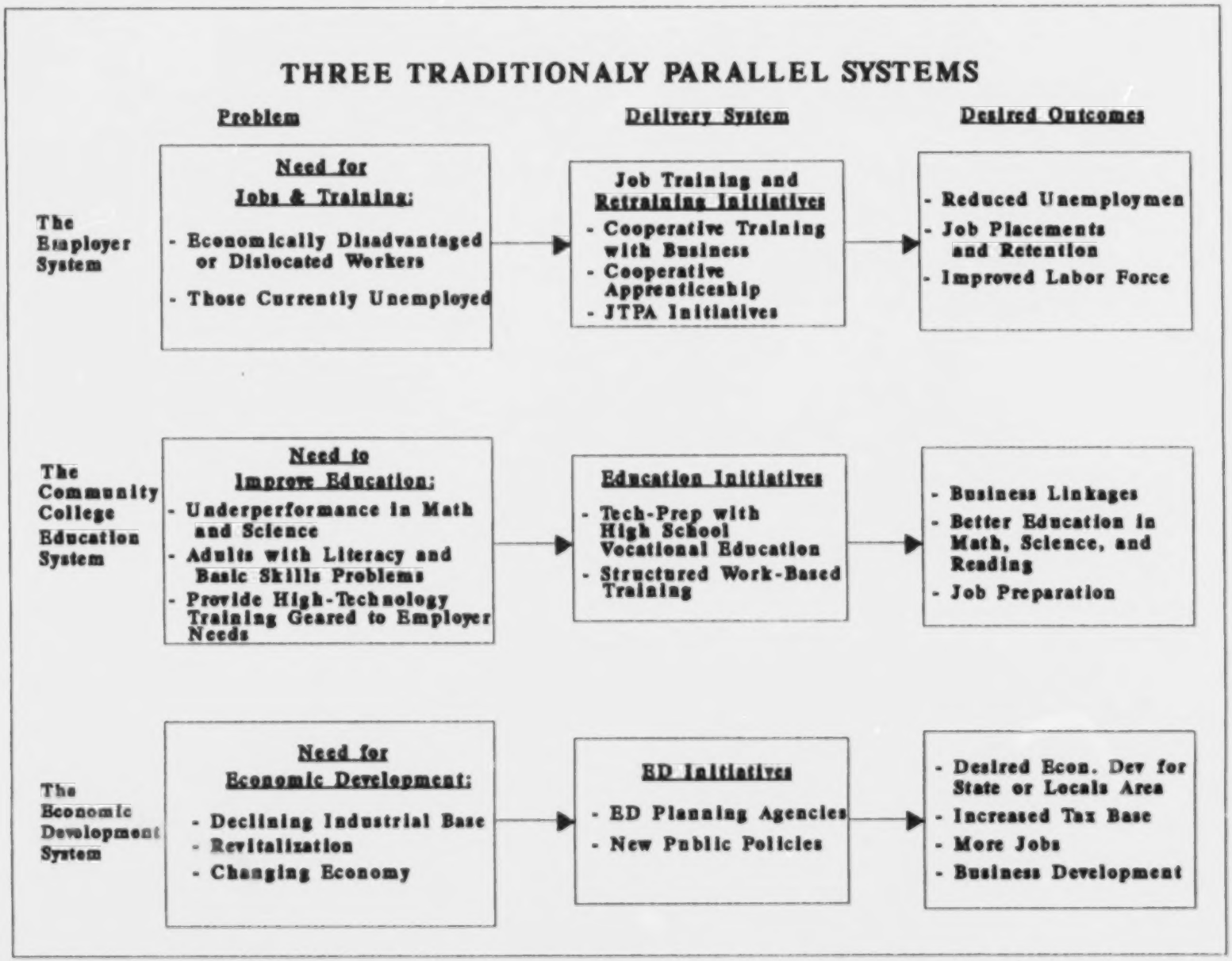
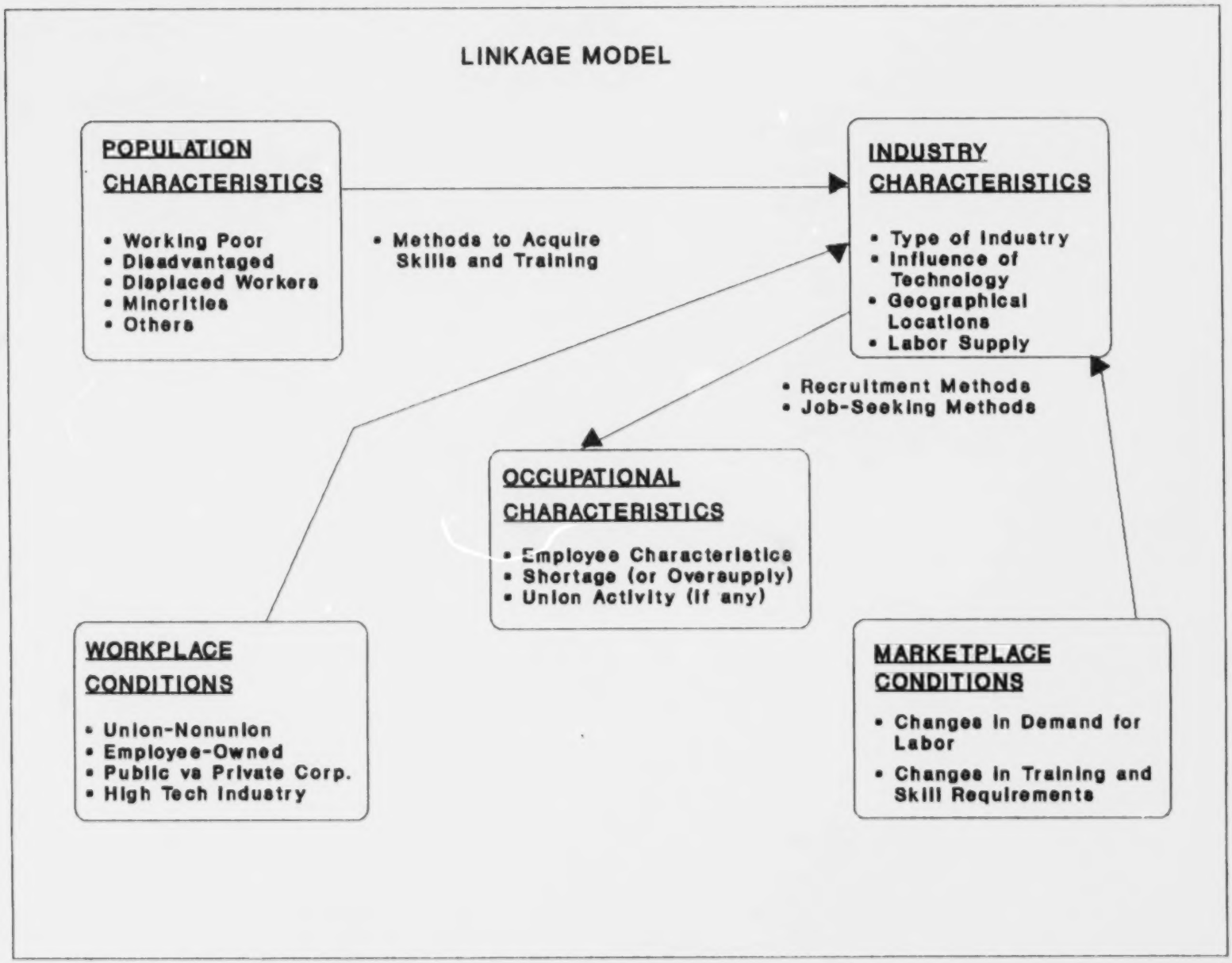

Problem
Delivery System
Desired Outcomes
The Employer System
Need for Jobs & Training:
- Economically Disadvantaged or Dislocated Workers
- Those Currently Unemployed
Job Training and Retraining Initiatives
- Cooperative Training with Business
- Cooperative Apprenticeship
- JTPA Initiatives
- Reduced Unemploymen
- Job Placements and Retention
- Improved Labor Force
The Community College Education System
Need to Improve Education:
- Underperformance in Math and Science
- Adults with Literacy and Basic Skills Problems
- Provide High-Technology Training Geared to Employer Needs
Education Initiatives
- Tech-Prep with High School Vocational Education
- Structured Work-Based Training
- Business Linkages
- Better Education in Math, Science, and Reading
- Job Preparation
The Economic Development System
Need for Economic Development:
- Declining Industrial Base
- Revitalization
- Changing Economy
ED Initiatives
- ED Planning Agencies
- New Public Policies
- Desired Econ. Dev for State or Locals Area
- Increased Tax Base
- More Jobs
- Business Development

Figure Caption

Figure 1-2. A hypothesized linkage model.


LINKAGE MODEL
POPULATION CHARACTERISTICS
• Working Poor
• Disadvantaged
• Displaced Workers
• Minorities
• Others
• Methods to Acquire Skills and Training
INDUSTRY CHARACTERISTICS
• Type of Industry
• Influence of Technology
• Geographical Locations
• Labor Supply
• Recruitment Methods
• Job-Seeking Methods
OCCUPATIONAL CHARACTERISTICS
• Employee Characteristics
• Shortage (or Oversupply)
• Union Activity (if any)
WORKPLACE CONDITIONS
• Union-Nonunion
• Employee-Owned
• Public vs Private Corp.
• High Tech Industry
MARKETPLACE CONDITIONS
• Changes in Demand for Labor
• Changes in Training and Skill Requirements

Endnotes

1. see: Cantor, J.A. (1990). Job training and economic development initiatives: A study of potentially useful companions. Educational Evaluation and Policy Analysis, 2(12), 121-138.

2. see: Parnell, D. (1990, Fall). The tech prep/associate degree program. Journal of Studies in Technical Careers, XII(4), 301-305.

3. see: Hamilton, S.F. (1990). Apprenticeship for adulthood: Preparing youth for the future. New York: The Free Press.

4. While white males have been the most employable segment of the U.S. population, having the highest levels of education and training, they are becoming scarce. They presently comprise approximately 47 percent of the workforce; by the Year 2000, they will account for only 15 percent of the workforce. We expect to see an influx of some 600,000 immigrants to the U.S. by the turn of the Century. It is expected that most of these will be females, Hispanics, and Asians (see also: Johnston and Packer, 1987; p. 97).

5. It is suggested that only 22 percent of all occupations require a college degree. However, the median years of education required by the new jobs created between 1984 and 2000 will be 13.5 compared to 12.8 of the current workforce. Johnston, W.B., & Packer, A.E. (1987, June). Workforce 2000: Work and workers for the twenty-first century. Indianapolis, IN: Hudson Institute, p. 97. Also see: Eurich, N.P. (1990). The learning industry: Education for adult workers. Princeton, NJ: The Carnegie Foundation for the Advancement of Teaching.

6. Cantor, J.A. (1990). ibid.

7. see: Mackenzie, J.R. (1982). Education and training in labor unions. Washington, DC: National Commission on Student Financial Assistance.

8. see: Glover, R.W. (1980, June). Apprenticeship in the United States: Implications for vocational education research and development. Columbus Ohio: Ohio State University, National Center for Research in Vocational Education, Occassional Paper #66, 8.

9. see: Stahl, B. (1980, October). Increasing union participation. VocEd, 42-45.

10. Glover, R.W. (1980), ibid.

11. see: Tuholski, R.J. (1982, October). Today's apprentices - tomorrow's leaders. VocEd, 42-45.

12. see: Rosenberg, B. (1989, May). An examination of the development of the first accredited labor college in the United States (Monograph). New Brunswick, NJ: Rutgers University.

13. see: Mantsios, G. (1984, Fall). Educating the ranks: The first five years of local 3's college program for electrical apprentices. Labor Studies Journal, 9(2), 151-166.

14. see: International Union of Operating Engineers. (1975, December). Dual-enrollment as a operating engineer and an associate degree candidate (Final Report). Washington, DC: Author.

15. Cantor, J.A. (1990), ibid.

16. Johnston, W.B., & Packer, A.E. (1987), ibid.

17. see: Parnell, D. (1991). The school-to-work connection. Washington, DC: U.S. Department of Labor, Employment and Training Administration. (author is President of the American Association of Community and Junior Colleges)

18. see: Whitworth, L.L. (1982, January/February). New pathways to apprenticeship. VocEd, 38-40.

19. see: Renz, F. & Styer M. (1986, October). Community colleges and apprenticeship training: A winning partnership. Paper presentation at the National Council for Occupational Education, San Diego, CA.

20. see: Horstrup, G., & Kracht, S. (1980, Spring). Apprenticeship program - A solution to low enrollment problems. Journal of Studies in Technical Careers, 11(7), 530-535.

21. Hamilton, S.F. (1990), ibid.

22. see: Van Erden, J. (1991, October). Linking past and present, students and jobs. Vocational Education Journal, 30-33.

23. see: Thomas, H.B. (1982, December). Identification of barriers and facilitators to linking vocational education and registered apprenticeship programs. Paper presentation at the American Vocational Association Meeting, St. Louis.

Chapter 2

The Employer System:

Job Training & Apprenticeships

The focus of this monograph is, of course, upon job training delivered through employer-sponsored cooperative apprenticeships with the community college. It is my hypothesis that employer-community college cooperation promotes both effective job training and worker education, and proactive community economic development. Hence the three systems: (1) the employer system, (2) the community college educational system, and (3) the economic system can and do interplay to positively impact business development, community economic growth and strive for full community employment. This chapter will explore the first of these systems -- the employer system and job training via cooperative apprenticeship. The next two chapters will take a look at the other two systems.

A Need for Coordinated Job Training

The need for greater investment in human capital is coming to the forefront of America's business and government policy. Why? Our nation's workforce is aging, and our labor markets are changing from labor surpluses to shortages. This is further compounded by an increasingly international mobility of technology, and an increasing amount of world trade and competition; all are factors that are driving human capital investment and training policy issues.[1] Yes, our economic well-being is tied to how well the issues of workforce skill development are addressed. This will be further discussed in Chapter 4.

In order for our American economy to regain world prominence, American workers themselves must work towards -- and benefit from a strong economic system. Benchmarks for certain success are found in education and training. Hence quality and efficiency in one's work effort must be a goal of all American workers.[2] To accomplish this goal, the United States must develop a job training system which provides for both acquisition of long-term work skills and opportunities for lifelong learning -- and combine these with the kinds of activities that promote workforce incentives for further education and training. One consequence of the attempts in educational reform over the last decade has been unilateral calls for joint efforts between business and industry, the public sector, and education towards meeting these goals.

Emerging Job Training Needs

Changing demographics, a marked decline in our nation's production, increased international competition and unbalanced trade conditions, and a poor outlook for the economic well-being of our next generation of workers, all underscore a need for "education-and-work connections."[3]

The increasing focus on worker training is an outgrowth of the changes occurring in all sectors of industry. Rapid technological change is increasing the complexity of the workplace. In the past, well-paying manufacturing jobs required little skills since they involved largely mechanical, repetitive motion. These jobs are being replaced by jobs that require independent judgment as well as

analytical and interpersonal skills. Thus, a worker needs a higher skill level than in prior years to qualify for a well-paying job today. This trend is expected to continue since the remaining low-skill jobs are projected to be in low-growth, low-paying jobs.[4] Johnston and Packer examined the skill levels in occupations projected to grow, and concluded that the jobs which will grow the fastest will require more language, math, and reasoning skills.[5]

Training for employment in existing businesses has been a traditional role for vocational education. The "education-to-work" connection should not be minimized. As we approach the Year 2000 the number of service-producing jobs will increase approximately 25% -- while the U.S. workforce will grow about 15%. At the same time a growing number of new jobs will require higher-level skills. Business will compete for qualified workers.[6] The aggregate of these circumstances indicates a need for our truly American educational institution -- the community college -- to join forces with business and industry to maximize resources for job training and proactive community economic development.

A Changing Worker and Workforce

The pressures of an increasingly complex workplace are compounded by the dramatic, demographic changes projected for the years ahead. The Department of Labor's Bureau of Labor Statistics (BLS) projects that the civilian labor force will grow by 21 million between 1986 and 2000. This represents an annual growth rate of 1.2 percent compared to a 2.1 percent annual growth rate

for the prior 15-year period.[7] The decline in the number of youth entering the labor force will raise the median age from 35 years in 1986 to 40 years in the Year 2000. Even more striking than this slowdown in growth and the aging of the labor force is the projected shift in its composition. Those groups which have traditionally faced the greatest barriers to full participation in the labor force will comprise an increasing percentage of the workforce. Blacks, hispanics, and other minorities will comprise 26% of the work force in the Year 2000, up from 21% in the year 1986. Women will account for 60% of the labor force growth.[8]

U.S. Bureau of Labor Statistics support the fact that more than half of all new jobs created between 1984-2000 will require some education beyond high school. Almost one-third will be filled by college graduates. In fact, the large majority of employers consulted contend that the complex and changing marketplace will continually heighten the need for a more highly qualified entry-level labor force. Future workers will need to work in more complex work environments, and demonstrate more complex and intricate tasks.[9] A particular job title (i.e., automotive mechanic) may remain the same; however, it will change dramatically in content and skill requirements.

The pervasive themes emerging from the literature reiterate what is known about the quality of this country's current entry-level labor force and the future labor force needs. First:

- Two-thirds of employers assess the current pool of entry level workers as insufficiently prepared in basic work-related skills.
- Employers are practically unanimous in their concern that job competencies of entry-level workers are also deficient.
- An overwhelming majority of the business representatives consulted indicated that basic reading and mathematic skills were essential to job success.
- Business representatives also indicated that entry workers needed other basic workplace skills including: flexibility and adaptability; problem solving; self-direction and initiative; and attitudes and work habits.

Today's as well as tomorrow's employees must also be more creative, able to work in teams, solve problems, and make decisions on their own. They must also be able to continually educate and upgrade themselves as technology advances. In order to keep up, vocational education must be responsive to rapidly changing workforce and workplace needs -- hence, via business and industry articulation and linkages.[10]

Challenges for Vocational Education

The facts of educational life are quite clear. Curriculum must be kept work relevant. Basic skills and workplace skills must compliment each other. Educators and entrepreneurs must be able to work together to match workplace needs to learner needs. Advisory

committees steering educational programs must take on new challenges. The community college has the unique ability to serve as a catalyst for these kinds of activities.

Workplace Training

A growing body of evidence points to formal workplace training as one solution to the skills gap problem. Recent research on how learning skills are acquired finds that programs that are successful in teaching thinking and learning skills share many of the elements of cooperative apprenticeship. Like cooperative apprenticeship, those programs which are identified as successful encourage student observation and commentary, and allow skills to build up -- piece by piece, gradually, and as a result of interplay between master and novice -- are organized around specific bodies of knowledge.

Dertouzos and Solow (1989) relate that:

> Workplace training makes it more likely that workers will come to understand the big picture: how context shapes the task and how contingent factors must be integrated into performance. Broader skills enable workers to make larger contributions to the productivity of the firm and also to go on through life acquiring new skills (p. 5).[11]

Work-based training programs are not only an effective method for skills acquisition; they also offer advantages for the individual worker. The worker can be trained and master skills while working

and earning a wage. For many cooperative apprenticeships this is the only way to advance into higher-paying, higher-skilled jobs.

Federal Vocational Legislation

For non-college bound youth, or for those not planning an immediate college experience, and particularly for those most vulnerable to dropping out before completing high school, formal work-based training programs offer opportunities to bridge the gap between school and work. There is a growing belief among educational researchers that current school policies are poorly designed for integrating non-college youth into meaningful careers. Typically, schools have close connections with colleges but weak linkages with employers. Yet, many of these youth will venture into jobs which will at some point in time require post-secondary education and training.

Despite the considerable benefits of using cooperative apprenticeship as work-based training programs, private investments in training has been limited. Most employee training has been informal. The total estimated employer expenditure for formal training is $30 billion annually; less than 2 percent of payrolls.[12] Given the benefits of formal learning on-the-job, the challenge is how to get employers to make the needed cost-effective investments in quality training for their workers.

The Perkins Act Reauthorization

In 1990, the U.S. Congress passed the Carl D. Perkins Vocational and Applied Technology Act Amendments of 1990 (Perkins

II). In Perkins II, a new program mechanism known as Tech Prep encourages articulation of high school curricula with vocational-technical programs at the postsecondary level into a sequenced four-year program. As implemented in the community college, the Tech Prep/Associate Degree Program takes a step beyond the usually cosmetic high school-college 2+2 programs. It is designed to be a structured and planned coordinated activity and runs parallel with current college preparatory programs. It combines a common core of learning with technical education and rests upon a foundation of basic math, science, communications, and technology -- all in an applied setting.[13]

A key theme of the new law and an area in which many two-year collegiate institutions have shown leadership is in establishing linkages with the private sector. Business and industry are well positioned to anticipate workforce needs, and by encouraging linkages, community colleges can more easily respond to changing workforce requirements. An appropriate foundation for a cooperative apprenticeship arrangement.[14] Perkins II also stresses accountability for program quality and standards related to students' improvement of academic skills, and their acquisition of job competencies and successes in the labor market. The Perkins II legislation also provides a baseline for vocational program delivery. Many community colleges have taken on this challenge by underwriting student performance in written guarantees of student performance.[15]

The Cooperative Apprenticeship and Vocational Education

Apprenticeship as Vocational Training: A History

Again, apprenticeship is not new. It is one of the oldest forms of training in which the skills and knowledge associated with the skilled occupations are passed from a skilled worker to a learner. Evidence of apprenticeship training has been found in the ancient Egyptian tombs. The Babylonian Code of Hammurabi provided a written account of a system of apprenticeship existing in 2100 B.C.

During the 13th and 14th centuries, expert craftsmen such as silversmiths, weavers, coach makers, and blacksmiths formed trade groups called guilds to keep the highest possible standards of quality and workmanship in their individual trades. One of the main duties of the historical guild master was to train apprentices to carry on the skills of the trades. A youth, usually at the age of 16, was assigned to a master craftsman whose trade was to be learned. This apprentice not only worked for and learned from the master, but actually lived in the same home as part of the family during the apprenticeship which lasted several years.

In the employer's shop, the apprentice was taught the skills of the trade, spending hours working under the careful supervision of the master. Work was checked every step of the way for skill and accuracy. In addition to learning the "secrets of the trade," the apprentice also learned to be industrious, reliable, and proud

of good work. Such a skilled and honest craftsman was assured a position of honor and prosperity in the community.

Apprenticeship Today

The apprenticeship concept by its simplest definition, is learning by doing under the auspices of a mentor or master crafts worker. Under our current "system," apprenticeship is structured on-the-job training combined with related, theoretical instruction, leading to certification of the attainment of journey worker status in a skilled trade.

The apprenticeship system in this country is also a unique partnership of business and labor, the primary operators of the program. Education and government play supporting roles, though the community college should take a proactive role. It is this kind of public-private partnership and training concept that holds great promise for meeting America's needs for securing a quality workforce.

Historically the system of apprenticeship has proven to be an effective method for the acquisition of skills. It has survived through the ages and is still widely used today. Government, at both the state and Federal levels, recognizes the importance of apprenticeship in developing an adequate supply of skilled craftsmen for economic growth and national defense. There are currently 300,000 registered apprentices -- a number which has been relatively constant over the last decade -- preparing for our 800 skilled occupations (and many more non-traditional occupations).

As practiced by modern industry, apprenticeship is a businesslike system designed to provide workers entering industry with comprehensive training by exposing them to both practical skills and related technical education and general education required in a highly skilled occupation. Laws such as the Fitzgerald and Perkins Acts encourage the expansion of apprenticeship programs and regulate their operations. As the demands of modern industry require even greater knowledge and skill on the part of today's craftsmen, apprenticeship program sponsors provide more systematically planned training than did the guildsmen of the past.

A balance of theory and practice. Work processes are arranged in a reasonable sequential order so that the apprentice receives supervised training on-the-job, and related instruction in the classroom. For example, a machinist apprentice may spend the first few weeks on the job as a toolroom attendant and learn the names and uses of the tools and give them out as they are called for. After completing the toolroom experience, the apprentice is assigned to a machine.

On-the-job apprentice training takes place under the close supervision of a journeyman worker. It is on-the-job that apprentices learn the practical skills that they will need to become skilled craft workers. The supervisor of apprentices, or whoever is assigned the responsibility of training, moves the apprentice from one operation to the next to insure a well-rounded work experience. At the end of a specified term, the machinist

apprentice has learned to perform operations with a high degree of accuracy with all types of materials on all types of lathes, milling machines, grinders, planers, shapers, and other machines. In addition, the apprentice has learned computer assisted functions, heat treatment techniques, bench work, and general machinery repair.[16]

The related theoretical information required to perform the job are learned in classes either after work or during a part of the day set aside for classroom work. In the related instruction class, the apprentice learns the mathematics which machinists must know, the quick checks, and the practical methods necessary for speed and accuracy. Blueprint reading, mechanical drawing, computer assisted design, safety, physics, and other sciences related to the work are learned. The apprentice also gains insights into the economic world, including industrial history, management, and labor relations. Sometimes this classroom work is taught by union or employer supplied instructors; -- and sometimes by cooperative agreement with community colleges. It is often delivered at the employer's job site.

Criticisms Levied at Vocational Education & Apprenticeship

Training by apprenticeship and vocational education have had reasonably close ties for many years. However, they have not individually or severally been without criticism. First, some advocate that neither have met their individual goals. Vocational education has often failed to provide well educated and trained

workers in the right numbers or craft areas; alternatively apprenticeship often fails to produce well rounded craftsmen.

However, cooperatively each system can attain its goals, and in fact, achieve even higher goals. Community college vocational education and apprenticeship linkages could greatly affect in a very positive manner each other's future as a system of training in high-technology areas. Rising costs of training, economic development needs, and business survival depend on productive linkages.[17]

The Joint Apprenticeship Committee Concept

Apprenticeship has had a long-standing tradition as a system of training designed and delivered cooperatively. As cooperative apprenticeship combines learning and earning, many different groups work together to coordinate program delivery. Private sector businesses, trade associations, unions, and professional associations all coordinate delivery of these programs with the local community college. Joint apprenticeship committees (JACs), composed of representatives of management, labor, and professional associations work together to develop and administer local apprenticeship programs. Often the community college participates on the JAC. Completion of all the requirements of the registered apprenticeship program entitles a graduate to receive a state certificate of completion, and often is also recognized for college credit towards an Associate Degree. This certificate attests to the attainment of certain minimum standards and is a passport to

jobs all over the country. The craftsperson who successfully completes both the work processes and related instruction required in the cooperative apprenticeship acquires status in the trade with others who have had similar experiences, as well as completes a significant portion of a college degree, a necessary prerequisite for assuming an industry leadership role.

The Government's Role

The Federal government's role is to promote apprenticeship and provide assistance and oversight under the National Apprenticeship Act. The National Apprenticeship Act (Fitzgerald) Act of 1937 is the legal basis for federal apprenticeship policy. The U.S. Department of Labor's Bureau of Apprenticeship and Training (BAT) is responsible for implementation of this Act. These regulations also recognize a state's authority. One of BAT's responsibilities is to register apprentices and issue certificates to apprentices who successfully complete approved programs.[18]

Guidelines for apprenticeship program endorsement include: (1) minimum apprentice age of 16 years; (2) non-discriminatory policies for recruiting or training/employment of apprentices; (3) employer and employee cooperation based on a formal schedule of work processes in which apprentices are receiving training and experience on-the-job. In addition this schedule must include instruction designed to provide an apprentice with knowledge of the technical subjects related to the trade. A minimum of 144 hours of instruction per year is necessary; as is increasing wages based

upon a set schedule. Close supervision of apprentices and adequate facilities are also required.

Federal apprenticeship program underwriting is but one way to develop and fund a cooperative apprenticeship program. The Perkins II program and tech prep also stipulates program guidelines and funding mechanisms.

Tech Prep Program Design

Tech prep is an articulated partnership between secondary and postsecondary vocational-technical education. Its goal is to ensure coordination of curricula across two or more educational institutions to ensure that graduates possess the prerequisite knowledge and skill required for successful employment in a chosen field. Tech prep also includes components for coordinated work-study by involving business and industry in the overall partnership. Parnell proposes linking secondary and postsecondary curricula across the entire academic spectrum -- college preparatory and vocational.[19] Many tech prep programs do operate in a "2+2+2" configuration, with the four year or university program coordinated with the community college.

Articulation with tech prep offers more efficient use of tax dollars for education and training. It eliminates unnecessary duplication of program content and includes technological content knowledge and skills critical to education and required by employers. Business and industry benefits by having employees trained and ready for international competition.

Factors that promote successful tech prep articulation efforts include student preparation through orientation and counseling; mentoring; and written transfer of credit agreements with receiving institutions.[20] Faculty development, participation, and leadership is also critical. Barriers necessary to overcome to implement tech prep programs must also be recognized. These often include:

(1) time for program development, away from teaching and other administrative duties for faculty and administration, business and community leaders;

(2) negotiations are often extensive and require specific quid-pro-quos for all involved;

(3) money to support program start-up and operations;

(4) conflict resolution must happen including territorialism which must be overcome; and

(5) unrealistic expectations must be moderated for all concerned.[21]

Many of these concerns parallel the concerns for implementing traditional vocational education apprenticeships.[22]

What Now?

The one area in which opinions are most consistent is in the support of cooperative apprenticeship as a method of training and its expansion to more skilled occupations throughout American industry. The supporting rationale is that the apprenticeship concept of structured on-the-job training, combined with classroom

instruction, is an ideal model for learning the job-specific skills needed by today's workers. Through experiential training backed by theoretical knowledge, cooperative apprenticeship also provides workers with the flexibility to exercise independent judgment and to learn in a work environment the skills needed to accomplish a job; while also learning how to work and to be able to adapt to changes in the workplace.

Another often cited strength of cooperative apprenticeship is its industry base. Because cooperative apprenticeship is operated by the private sector, (employees and in many cases in conjunction with labor) the training can be tailored to the specific needs of the employer.

Discussions with employers and education about partnerships for job training and education yield certain responses about such partnerships. Paramount was the need for better communications including clear roles and responsibilities, and appropriate organizational resources. An elimination of preconceived notions of outcomes is also important. Both business and education indicated a need to develop mechanisms to reduce isolation of their two worlds in order to better prepare students for the workplace and for responsible adulthood.[23]

Within this industry-based framework, government and community college education have important roles to play. Many feel that more could be done to assist and support industry in establishing and maintaining work-based training programs. Among the many

specific suggestions, promotion and technical assistance were most frequently mentioned as appropriate support activities.

In Summary

Cooperative apprenticeship remains a viable system of training because it produces well-rounded, productive and flexible workers in demand occupations. Accordingly, the potential exists for expansion within its traditional boundaries. The need for skilled workers in construction and certain manufacturing trades is projected to increase, and apprenticeship can play a vital role in meeting this need.

However, outside the traditional trades, the emphasis upon the comprehensiveness of skill occupations is not as pronounced. Therefore, in order to maximize the opportunities to expand cooperative apprenticeship and at the same time strengthen training in other occupational areas, the strengths of a traditional vocational education delivery system must be capitalized upon. The apprenticeship concept combined with the principles of cooperative workplace learning is suggested. The apprenticeship method of experiential learning has proven effective at all skill levels and is particularly suited for technical training and retraining. This study has demonstrated this in public service technologies of fire and emergency medical services, as well as maritime trades and automotives.

Cooperative apprenticeship is a model of industry, labor, government and community college education working together to

further the interests of the worker and the workplace. At a time when there is much interest in leveraging cooperation between public and private sectors, it is appropriate to re-examine the apprenticeship model. Accordingly, cooperative apprenticeship clearly serves as an effective model with broad applicability.

Endnotes

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2. see: Kolberg, W.H., & Smith, F.C. (1992, February). A new track for blue-collar workers. New York Times Forum, F-13.

3. see: Eric Clearinghouse on Adult, Career, and Vocational Education. (1992). Trends and issues: Vocational education involvement with business/industry/labor, 1.

4. U.S. Department of Labor, (1989), ibid.

5. see: Johnston, W.B., & Packer A.E. (1987). Workforce 2000: Work and workers for the 21st century. Indianapolis, IN: Hudson Institute.

6. see: National Alliance of Business. (1989). Time: The disappearing quality of the U.S. workforce: What can we do to save it? Washington, DC: Author.

7. U.S. Department of Labor, (1989), ibid.

8. U.S. Department of Labor, (1989), ibid.

9. see: U.S. Department of Labor, Education and Commerce. (1988, July). Building a quality workforce. Washington, DC: Author.

10. see: Brand, B. (1990, Fall). The U.S. Department of Education's perspective of postsecondary technical training needs. Journal of Studies in Technical Careers, XII(4), 295-300.

11. see: Dertouzos, M.L., & Solow, R.M. (1989). Made in America, regaining the productive edge. Cambridge, Mass: MIT Commission on Industrial Productivity, 5.

12. U.S. Department of Labor, (1989), ibid.

13. see: Parnell, D. (1990, Fall). The tech-prep/associate degree program. Journal of Studies in Technical Careers, XII(4), 301-305. and Scott, R.W. (1991, February). Making the case for tech prep. Vocational Education Journal, 22-23 and 63.

14. see: Anderson-Yates, M., & Washburn, J. (1990, Fall). A new vocational education act: Priorities for the future. Journal of Studies in Technical Careers, XII(4), 277-283.

15. see: The American Association of Community and Junior Colleges. (1991, December 3). Colleges moving to guarantee their graduates. Community Technical and Junior College Times, III(22), 1.

16. see: New York State Department of Labor, Apprenticeship and Training Council. (1987). An overview of apprentice training. Albany, NY: Author. Also see: National Association of State and Territorial Apprenticeship Directors. Testimony by Donald J. Grabowski, President before the Commission on Workforce Quality & Labor Market Efficiency. Northlake Community College, Irving TX, May 2, 1989.

17. see: Westbrook, R.C., & Butler, R.L. (1981, Fall). Apprenticeship-vocational education linkage: A course of action. Viewpoints in Teaching and Learning, 57(4), 65-70.

18. see: Van Erden, J. (1991, October). Linking past and present, students and jobs. Vocational Education Journal, 30-33.

19. see: Parnell, D. The neglected majority. Washington, D.C. American Association of Community and Junior Colleges, 1985, (ED 262 843).

20. see: Robertson-Smith, M. (1990). Articulation models for vocational education (Information Series No. 343). Columbus: ERIC Clearinghouse on Adult, Career, and Vocational Education, Center on Education and Training for Employment, The Ohio State University, 1990.

21. see: Stanley, P., Morse, B. and Kellett, C. (1992, April). Tech Prep "plus." Vocational Education Journal, 32-33, 54.

22. see: Thomas, H.B. (1982, December). Identification of barriers and facilitators to linking vocational education and registered apprenticeship programs. Paper presented at the American Vocational Association Meeting, St. Louis.

23. U.S. Department of Labor (1989), ibid.

Chapter 3

The Community College Education System:

Community Colleges and Apprenticeships

An Evolution

The American community college movement is undergoing an evolution. Community college leadership is realizing a need to refine and focus its mission statements and goals to best meet its local constituent needs for: (1) programs to provide worker job skills in new and emerging technologies; (2) support for business development and general community economic development; and (3) services to increase citizen literacy. These goals will better reflect local demographic characteristics, business and industry representation, and workforce needs. They will also better meet requests for short-cycle occupationally-integrated education and/or technical and transfer programs as demanded. A major focus of the current community college movement is towards experientially-oriented instruction in its various programs to provide learners with more realistic training and education.

Cooperative Apprenticeship - A Possible Solution

As we approach the year 2000, 75 percent of all jobs will require post-secondary education -- best delivered by the community college.[1] Community colleges have invested increasing amounts of resources towards customized job training programs, other types of training aimed at economic development objectives, "entrepreneurship centers," and even related activities such as business assistance services or the operation of incubator buildings for start-up businesses.[2,3] Yes, community colleges

are unique institutions of higher education. They have been active in apprentice training for some time. While generally providing related classroom training, some have also designed programs to meet the increasing technological needs of the firms, industries, or unions that they serve, and simultaneously providing economic development support to businesses and communities.[4,5]

Apprentices on Campus

Community college dual enrollment of trainees in apprenticeships is not new to business-sponsored training.[6] What is new is a move towards a trainee earning college credit for the hands-on portion of the program towards an Associate Degree.[7] Business and industry as well as organized labor recognize that the Associate Degree is a basic necessity in high-technology fields.[8] They are also recognizing that a higher education will aid the worker in being a better and more productive employee and/or union member.

What does each of the partners bring to and derive from this partnership in order to facilitate such a working relationship?

A Proactive Community Service Role

The community college has assumed a prominent role in apprenticeship training through apprentice classroom instruction and other related activities.[9] Community college participation in cooperative apprenticeship programs often also includes:

(1) technical support to business and industry;

(2) course and program development and operation;

(3) trainee recruitment;

(4) testing, placement, counseling, and remedial education of students;

(5) instructor recruitment, training and development;

(6) access to external funding to operate the programs and financial aid for college attendance, thus offsetting the cost for the business;[10]

(7) special facilities; and

(8) granting college credit toward an Associate Degree for apprentice "on-the-job" portions of training;

Technical Support to Business and Industry

Community college support to business and industry has often included technical and consultative advice as well as customized training program development. Storefront centers for services at community colleges emerged in the 1970s and continues today.[11] Many of the services provided by these centers encourage, support, and sustain industry-based work-study opportunities for students. Included are business outreach services such as customized training for business and industry, on-site college programs for business and industry, sponsorship of entrepreneurial "incubator" centers and small business assistance centers and identification of sources of venture capital for small businesses.

Course and Program Development and Operation

Community colleges have long been active in apprentice training generally providing related classroom training. Some have

also designed programs to meet the increasing technological needs of the firms and industries they serve, as well as providing apprentice workers the higher education backgrounds (and in some cases basic skills education) which these workers will need.[12] Several community colleges have developed curricula and degree programs specifically for apprentices and industries and firms operating programs.[13,14] Labor and business leaders realizing this fact seek out the community college to design curricula to link business and labor needs and the world of work.[15] College faculty most often have provided the leadership in course and curricula design to compliment the technical input from the business or trade group sponsoring the course design efforts. Pending community college technical education legislation can make participation in these programs even more attractive.

New Sources of Enrollments

Community colleges have also reaped some very definite benefits from program sponsorship -- including large numbers of FTEs from such programs. Community colleges from an enrollment perspective are realizing the benefits to be derived from working with labor and industry through apprenticeship.[16] Generally, programs run an average of three academic years, and enroll better than average class sizes.[17] Through cooperative training arrangements with employers, workers become aware of the educational opportunities offered by the community college and

pursue these opportunities well past the initial employer-sponsored training.

By its very mission, the community college provides opportunities for second careers, changes in careers due to industry fluctuations, business retraining needs, etc. Community colleges work with business and industry to recruit students for training and career opportunities. Sometimes this takes place through career days in general, or specific career days in industry.

Student Testing, Placement, Counseling and Remedial Education

The community college has traditionally provided an opportunity for students to gain a higher education in a more flexible environment than the traditional university. Community colleges service more: part-time students; evening students; working students; students with various learning difficulties; non-traditional populations; limited-english speaking populations; etc. The community college emphasizes the opportunity for a student to try out a career option through exploratory entry-level courses.

Often times, business recruits directly and forwards the student to the college for testing, counseling, screening, and training. Community colleges are well prepared to offer counseling and testing services, vocational aptitude screening, as well as developmental educational opportunities to maximize a student's ability to succeed in a chosen field.

Instructor Recruitment, Training, and Development

It is very common to find cooperating business and industry and/or labor generally staffing the technical college courses, or providing access to recruit technical talent to recruit as teachers. The college will provide some kind of in-service training for these adjunct faculty to assist the business person in developing instructional skills.

Some cooperative efforts also result in college faculty "swaping places" with business and industry employees, wherein the business person becomes an adjunct college faculty member and the regular college faculty member goes to work in industry for a sabbatical period. The faculty member becomes renewed in the state-of-the-art of the discipline, and gains a period of cognitive refreshment at the same time. Herein is the quid pro quo.[18]

Program Funding and Financial Aid for College Attendance

Perhaps the single most important service the community college can offer to business and industry is the ability to access public and grants funding to support program development and operations. These funding sources might include Perkins Vocational Education Acts monies; state Apprenticeship funding; Pell Grants for student tuition aid; private sources such as Kellogg Foundation, Annenberg grants, etc.

Funding can offset the costs of program start-up, or on-going program operations. Individual states have specific monies available through the community college for training, which has as

its objective, local economic development. These include programs such as the Liberty Partnership.

Access to Equipment and Facilities

Cooperating business and industry and/or labor generally provide specialized equipment and materials. Colleges thus have an opportunity to operate state-of-the-art programs for little capital outlay. Business generally assists by staffing the technical courses and providing specialized equipment and materials. Colleges thus have the opportunity to operate state-of-the-art programs for little capital outlay. Herein is a quid pro quo.[19] Firms such as General Dynamics, Newport News Shipbuilding, and others encourage the community college to offer courses at the work site, and open such courses to spouses of employees, and others, as a community service. Such opportunities provide extra classroom space for the college, and additional enrollments otherwise not possible.

College Credit for Apprenticeship Dual Enrollment

Community colleges have also provided complimentary technical and general education to business-operated training programs including apprenticeships. The community college can grant college credit for the program, including the apprenticeship component, and confer college degrees for program completion. As I will describe herein, organized labor unions such as the IUOE and IBEW are major supporters of credit earning apprenticeship training in cooperation with employers and community colleges.[20]

Tech Prep Program Development

The Perkins Vocational Education Amendments of 1990 provide guidance and funding support for community colleges to work with area secondary education and business and industry to develop articulated technology-oriented career preparatory programs.

Successful program design requires strong central leadership at the community college level. It also requires that all parties concerned benefit in-kind for their participation. National labor unions, professional trade associations, business groups, and major corporations all have worked with community colleges to provide course and curricula designs to meet their specific business and labor interests, and gain well-trained employees. Many of these efforts have, in turn, benefitted student and community groups other than primary student populations. Once programs are implemented, all community groups have opportunities to participate.

Tech-Prep programs provide opportunities for students to begin formal education and training for a career or occupation in secondary school; an articulated program with the community college then guarantees continuity without unnecessary duplication of the program at the community college. These programs also provide work-based instruction with cooperating employers. In a number of Tech-Prep programs, articulation between the community college and four-year bachelor's degree programs permit continuity into a four-year institution.[21]

Figure 3-1 displays an articulated cooperative eduction model used by Macomb Community College.

Insert Figure 3-1 about here

An Expanded Role for the Community College in Economic Development

Community colleges are assuming new and emerging roles in community economic development through expanded institutional missions and goals.[22], [23] Kingry and Cole identified twenty-three activities prominent in community college economic development services.[24] Activities included the technical assistance (pre-screening and skills assessment of new employees for businesses, consultation in specific disciplines or in business operation, job placement services, and technical library resources); technical training (including customized training, short courses, retraining or upgrade training, management skills, career and vocational counseling); and business development services (research and development in business areas, incubators, financial assistance identification).

I cannot over-stress the fact that community colleges are unique institutions of higher education. By designing customized programs to meet the specifications of a firm or industry, they are capable of meeting varying needs of a particular locale; hence they simultaneously provide economic development support to the

businesses and communities that they serve. The community colleges often provides services through participation as a contract training agency to the local Private Industry Councils (PIC), thus serving as a training delivery source for job training under JTPA. In this role, the community college provides vocational training, pre-employment training, job readiness counseling and training, job search assistance, remedial (i.e., ESL) instruction, as well as apprenticeship instruction.

The Task Force on the Role of Community Colleges in Economic Development surveyed the nation's community colleges and reported national trends in this broad economic development area.[25] The most significant finding was that the nation's colleges are beginning to re-examine the impact that they have on the economic development of the communities they serve. Over eighty-five percent of the colleges reporting promote their involvement in economic development. One third have published institutional mission statements referring to their various economic development activities.

As a testament to their involvement, forty-seven percent of the responding colleges have a designated economic development specialist on staff, and seventy-seven percent of the colleges encourage faculty involvement in economic development. The study also identified catalytic and diffusion activities of the responding colleges, and document over 50 projects at colleges nationwide. Credit for some of these catalytic and diffusion

activities rest with organizations such as the American Association of Community and Junior Colleges, National Council of Occupational Education and the National Postsecondary Alliance and Sears-Roebuck Foundation (AACJC) Keeping America Working Project).

An Illinois study indicated that 95% of the responding colleges had established linkages with economic development agencies.[26] In their roles many of the responding colleges offered technical assistance in the forms of management counseling, resources for information, cooperative education and apprenticeship programs, and community support kinds of services. Seventy percent of the respondents also provide quick start training of employees of new and expanding business. The study found that throughout the country, colleges are capitalizing on current and future trends for custom in-house education, contract training, and apprenticeships. Catalytic activities according to this report, consist of community college:

(a) linkage with other state and local agencies to support the establishment of new and expanding business and industry;

(b) extension of technical assistance to business and industry in the essential managerial functions of planning, organizing, implementing, and controlling; and

(c) delivery of job specific entry-level and supplemental customized training.

Each of these activities are also necessary for the support of cooperative apprenticeship programs.

Variations in the services offered by many colleges are best reflected in:

(a) the degree of involvement;

(b) whether the involvement is active or passive (such as organizing, coordinating, brokering, consulting, establishing, coordinating vs providing space);

(c) whether the involvement should be essentially an internal effort of the college or whether it should concentrate on bridging the gap with already existing economic development efforts;

(d) whether the involvement should include personnel or only functions; and

(e) whether the college should serve as a catalyst or performer of identified tasks.

Community colleges cannot simply commit themselves to do work-based training program design and operation, and concomitant local economic development, but must cause it to occur, according to Mundhenk.[27] One such way is through participation in cooperative work-based training such as apprenticeship, as found in a study undertaken by the AACJC and the National Center for Research in Vocational Education (see Table 3-1).[28]

Table 3-1

Community College Involvement in Contract Training

	# Colleges Responding	Percentage of Colleges Providing Training
Academic or General education portion of Apprenticeship program	176	35
Formal Apprenticeship Training	21	35
Number of clients/employers	27	n/a
Number of students enrolled	260	n/a

Now What?

Through a recognition that work-based training program design and development and its effects upon local economic development is and always has been part of the community college mission, it is essential to understand and assert that the community college's inbetweeness is an advantage. How, then can it best be achieved?

- o Involve college staff in community development and planning activities and make work-based education as well as economic development a broadly shared responsibility.
- o Focus contacts with business and industry and define a market segment and accurately stick to it.

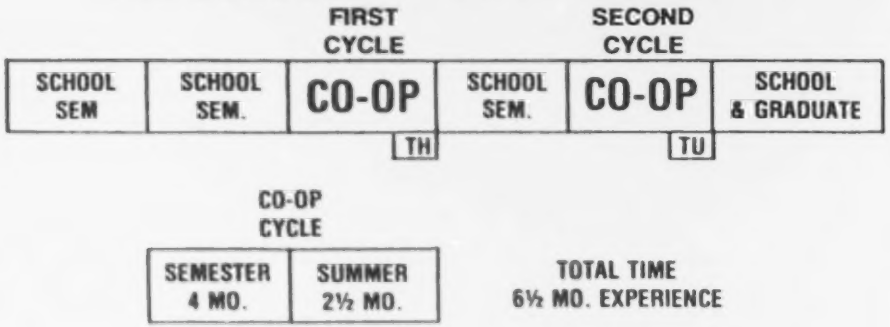
- Find partners in education and in industry and develop flexible work-based programs and approaches (i.e., cooperative apprenticeship).
- Emphasize the college's role in technology transfer as well as in job creation and development and be sensitive to the importance of leverage.
- Collaboration and support for cooperative apprenticeship and other forms of work-based training and concomitant economic development is often accomplished by a triangulation of business/industry, development groups (quasi-governmental, state, and local) economic development agencies, and community colleges.[29]

Figure Caption

Figure 3-1. A cooperative education model used by Macomb Community College.

THE INDUSTRIAL COOPERATIVE EDUCATION PLAN

THE SCHOOL AND CO-OP CYCLES



1ST CYCLE SEMINAR
THURSDAY EVENING

SEMINAR CONTENT

1. COMMUNICATION EXPERIENCES
2. HUMAN RELATIONS TRAINING
3. AWARNESS OF TECHNOLOGY TRENDS
4. WORK ETHIC AND PRODUCTIVITY
5. THEORIES OF LEADERSHIP
6. RESUME DEVELOPMENT
7. CO-OP REPORT

2ND CYCLE SEMINAR
TUESDAY EVENING

SEMINAR CONTENT

1. ISSUES OF ENERGY & ECONOMICS
2. PRINCIPLES OF MANAGEMENT
3. DEVELOPMENT OF COMMUNICATION SKILLS
4. MANAGING TIME
5. THE ISSUE OF STRESS
6. DEVELOPMENT OF LISTENING SKILLS
7. MOTIVATION THROUGH JOB ENRICHMENT

THE SEMINAR INSTRUCTION RELATES TO THE CO-OP STUDENT AT THE WORK PLACE

Co-op Coordinators
BOB DUEWEKE
445-7434
PAUL GOULD
445-7431

Macomb Community College

THE PROCESS

1. COORDINATOR ORIENTATION
2. CO-OP APPLICATION
3. FACULTY RECOMMENDATION
4. COMPANY ORIENTATION
5. READ CO-OP REPORTS
6. COMPANY INTERVIEW
7. ACCEPTANCE

STUDENT REGISTERS FOR CO-OP

ICE-254 FALL OR SPRING	4 CR. HRS.
SUMMER	3 CR. HRS.
TOTAL PER CYCLE	7 CR. HRS.

HOW DO I EARN A GRADE?

1. SUPERVISORS CO-OP EVALUATION TWO PER WORK PERIOD
2. ACADEMIC PERFORMANCE IN THE SEMINAR.

WHAT ARE MY OPTIONS?

1. WORK FULL TIME - UPON GRADUATION.
2. GRADUATE FROM MACOMB & ENTER A 4 YR. COLLEGE AND CONTINUE CO-OP.
3. GRADUATE FROM MACOMB WITH:
   - A. AN ASSOCIATES DEGREE & CERTIFICATE IN COOPERATIVE EDUCATION
   - B. EXPERIENCE
   - C. PURSUE ANOTHER TECHNICAL AREA
4. ENTER A THIRD CYCLE OF CO-OP IF NEEDED TO COMPLETE DEGREE REQUIREMENTS.

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Chapter 4

The Economic Development System: Relationships to Job Training and the Community College

The relationship of economic development goals and activities and those of job training has become a topic of increased interest to local business, civic, educational and governmental groups over the last several decades. Perhaps this interest results in part, from a depressed economy, growing unemployment, and a recognition that we as a society are becoming too dependent on foreign economies for our goods and products. At the same time we have become dangerously complacent with levels of worker training and competence.

Success in economic development and a fuller employment is highly dependent on the mutual cooperative efforts of community colleges and local civic and political groups, governments, business and industry and education in a manner which capitalizes on a localities scarce resources. Thus effective community college linkages with business and industry as a key to successful economic development and a fuller employment, has been explored by policy makers. Issues of what causes collaboration to occur (i.e., cooperative apprenticeship), the organizations involved, and their various roles, are of interest to community college and business leaders and policy makers alike.

A Conceptual Understanding

Two broad trends have reinforced the need to link job creation and training initiatives with economic growth. First, the gradual national shift to a service-intensive economy, mirrored by the

decline of the traditional manufacturing industries have resulted in a new set of priorities in local economic development. Whereas economic development used to focus more on capital incentives such as revenue bonds, low-interest loans, and tax incentives, human capital considerations now frequently outweigh these other factors.[1] Thus, businesses have become more acutely sensitive to the conditions affecting their labor force, including hiring and training methods and incentives, as well as linkages with local community college training programs via cooperative work-based training such as apprenticeship.

What Is Economic Development

Economic development has been defined as an organized, planned, and cooperative effort between the public and private sectors to improve the economic conditions in the community and state.[2,3] An analysis of the components of these activities include:

(a) a process occurring within a geographic area that encourages the revitalization, expansion, and attraction of business and industry, providing increased employment opportunities, and maintaining or enhancing the quality of life of its citizens;

(b) a coordinated, cooperative effort among business, industry, labor, all levels of education and government; and,

(c) a clearly defined role and responsibility for all groups and individuals involved in implementing the activities associated with the process.

Parties Involved

Collaboration and support for economic development is often accomplished by a triangulation of business/industry (i.e., the employer system); economic development agencies (i.e., the economic development system) including development groups (quasi-governmental, state, and local); and community colleges (i.e., the community college education system) such as achieved by employer dual-enrollments of apprentices.[4] Figure 4-1 presents an overview of the identified emerging patterns of collaboration.

Insert Figure 4-1 about Here

How Does Collaboration Occur?

It is hypothesized that economic development collaboration best occurs when maximum cooperation is achieved by all parties, each of whom stands to benefit in some form. Further, it is believed that it best occurs when it is controlled at a local level and is focused on small business, and maximizes the use of resources and services without undue duplication.[5] Therefore, the roles, responsibilities and unique abilities of each of the major entities can be significantly useful to test understanding.

Business and Industry Role

Through membership on various community-based organizations such as chambers of commerce, private industry councils, councils of 100, and business associations, local business and industry has taken a leadership role in promoting specific community economic development interests. Often these organizational bodies work with local government to attract new industry to a region; or change taxing structures and other legislative actions to make a community more desirable for business to operate. Often these bodies work with a local community college to develop and/or promote the training of people to work with a business or industry as relocation occurs, or as a change of product happens. Proactive economic development occurs through these kinds of interactions.

Economic Development Groups

A number of parties are involved in community economic development. These include governmental agencies, business community groups such ad chambers of commerce, committees of 100, business professional groups, civic groups, and community economic development foundations. Each will be described here.

State/local governmental roles. Most state governments, through their offices of economic development, provide some form of technical assistance and financial resource to its municipalities and businesses seeking guidance in either relocation or expansion. This technical assistance takes the form of: (1) site surveys; (2) sponsoring training for initial or expanding work forces through

the state's divisions of employment and training, and joint apprenticeship councils (JACs); or (3) financial assistance to people to receive training. States providing unusually aggressive or unique approaches to this activity include California, Florida and North Carolina.

The California Department of Labor's Employment and Training Panel[6] provides state grants directly to firms seeking to upgrade or retrain work forces in industries deemed desirable to the state's economy. California's Joint Apprenticeship Council structure is also very well recognized. The California State Firefighter JAC was examined in this study. Florida provides an aggressive marketing and support effort for identifying, recruiting and relocating clean and hi-tech business and industry into the state.[7] Services include identification and linkage to training support for Florida's residents to prepare for work in these industries. Florida's apprenticeship JAC support is also well recognized. Citicorp is one success story under this scenario. North Carolina through its Department of Community Colleges, Industry Services Division[8] provides state support linking businesses and their job training directly to a network of community colleges around the state.

Municipalities and/or county governments are also very involved in this economic development effort on a local level. Many such entities provide a marketing role to attract and support business and industry into their community. These roles often take

the shape of site location, financial package development, manpower recruitment and training, and assistance in meeting local codes and regulations. The Harford County (Maryland) Department of Economic Development and Missouri's St. Louis Manpower & Training Authority are good examples of successful local agencies.[9]

Quasi-public agency roles. Another party in the economic development system has emerged over the last two decades at both the regional and local levels. This player - the economic development corporation - serves a needed role in the total picture. It functions as a non-governmental service-oriented, and not-for-profit entity under IRS Code 501(c)3. It is capable of directly matching government services such as economic development planning, with finance and loan packages, job training assistance such as JTPA, and other technical assistance with client business and industry. It assists in marketing its region or locality. Very successful organizations have emerged in this capacity such as New Hampshire's Highlander Economic Development Corporation.[10] Others include Kentucky's Bluegrass State Skills Corporation, and Maryland's Susquehanna Private Industry Council.[11,12] Many of these agencies such as Susquehanna emerged as entities out of the need for delivery organizations under the Job Training Partnership Act of 1983.

The Role of the Community College

A fourth and powerful organization becoming more involved in the economic development partnership is the community college.

This unique organization, once viewed solely as an educational institution, possesses the resources, capabilities, local community-based avenues, and economic interests to serve as a catalyst in overall local economic development; and simultaneously provides valuable service to business and industry within its community service area.[13]

The Community College and Economic Development

Community colleges are assuming new roles in community economic development through their expanded institutional missions and goals.[14] Included are business outreach services such as customized training for business and industry; on-site college programs for business and industry; sponsorship of entrepreneurial "incubator" centers and small business assistance centers; and identification of sources of venture capital funds for small businesses.

Each of these activities are an integral part of cooperative apprenticeship program support. Kingry and Cole identified twenty-three activities prominent in community college economic development services.[15] Activities include:

(1) <u>technical assistance</u>

- o pre-screening and skills assessment of new employees for businesses;
- o consultation in specific disciplines or in business operation;
- o job placement services; and

- o technical library resources;

(2) <u>technical training</u>

- o customized training;
- o apprenticeship related instruction;
- o short courses;
- o retraining or upgrade training;
- o management skills; and
- o career and vocational counseling; and

(3) <u>business development services</u>

- o research and development in business areas;
- o incubators; and
- o financial assistance identification.

The community colleges often provide services through participation as a contract training agency to the local Private Industry Council (PIC), thus serving as a training delivery source for job training under JTPA.[16] In this role, the community college provides vocational training, pre-employment training, job readiness counseling and training, job search assistance, remedial (i.e., ESL) instruction, as well as apprenticeship instruction.

Community colleges have invested increasing amounts of resources towards customized job training programs, other types of training aimed at economic development objectives, entrepreneurship "centers" and even related activities such as business assistance services or the operation of incubator buildings for start-up businesses.[17,18] Second, job training funded programs such as

The Job Training Partnership Act (JTPA), have indeed become more successful in placing their participants in actual jobs, rather than in merely providing job training.[19] Yet, this very success has produced a greater expectation and need to examine the long-term viability of the jobs in which placement has occurred--e.g., whether in fact they are part of growing or declining industries--and whether to focus on such factors as job retention and an individual's later salary experience.[20] Thus, for Program Years 1988 and 1989, the JTPA has revised its standards to include an assessment of job retention and earnings--three months after participants terminate from a local program--and not just initial job placement.

Apprenticeship Dual-Enrollments

Combined, the two trends have led to an increasing awareness of the need to link job creation efforts (via mechanisms such as dual-enrollment apprenticeships) with economic growth. An especially important ingredient in this linkage is the role of small businesses, which have been credited with providing the vast majority of new jobs in the country (although considerable controversy exists regarding the precise methods for estimating this role of small business).[21,22], Within the structure of American industry, small businesses have a special role because they usually lead industries through new, innovative phases, and as a result create new jobs.[23]

Collaboration between community college activities in job training and apprenticeship dual-enrollment and the broader economic development efforts within the community can occur in many ways and at many levels. An understanding of interorganizational collaboration becomes necessary to comprehend the "big picture."

Organizational Collaboration

Five alternative explanations regarding the reasons why, and how organizations collaborate have been prominent in previous research.

1. Organizations successfully collaborate because they derive mutual exchanges from each other.[24,25]
2. Organizations collaborate because they are able to increase their access to external funds of governance opportunities.[26]
3. Organizations are given mandates to collaborate, as in a legislated set of functions. Under this condition the creation of the necessary statutes and regulations would alone cause an arrangement to operate.
4. Organizations collaborate because they develop formal agreements between each other, specifying the responsibilities of each participating organization.[27]
5. Organizations collaborate because they have conflicting goals, and the collaboration allows the organizations to mediate their conflicts in a socially approved manner.[28]

Barriers to Linkage

With all of these well-intentioned organizations scurrying around attempting to improve the overall economic and employment situations of their respective states and communities, the question remains as to why these problems persist. An answer rests in the ability of these organizations to share resources, articulate needs and intentions, and communicate. Hence, coordination lies at the center of linkage; barriers to this coordination and communication must be overcome.

Coordination of activity becomes essential when state, local, and non-governmental organizations all attempt to interact or link. A need exists to ascertain workable solutions to this marriage of government, between economic development interests and job training needs.

Unfortunately, the linkage between job creation and economic growth initiatives goes counter to the ways in which these initiatives traditionally have been organized at state and local levels. Typically, the public policies and services related to these two areas, as well as those involving a critically important third area--education--have operated as parallel systems (see Figure 4-2), with:

* economic development policies being the province of local government and local economic development agencies;

* job training being administered by corporations as well as by the job training operators sponsored by such related public initiatives such as JTPA; and.

* educational practices being governed by local school systems and postsecondary institutions such as community colleges.

The parallel nature of these systems can produce potential "mismatches" in outcomes. For instance, economic development initiatives, such as the establishment of an enterprise zone may be underway that will eventually reduce the need for certain jobs, even though job training programs are presently placing new employees in those very same types of jobs.[29,30] Similarly, educational practices may not give the appropriate emphasis to academic subjects most relevant to job training or employment needs.

Insert Figure 4-2 about here

Ironically, those institutions credited with the greatest role in job creation outcomes--small businesses--are the most vulnerable to any of these types of mismatches, because such businesses:

(a) have few resources for training their own employees (and in this way overcoming the deficiencies in the available labor force);

(b) cannot easily recruit and relocate new (and more appropriately trained) employees from other locations around the country; and

(c) cannot themselves relocate readily to other places.

Efforts to Improve Linkage via Apprenticeship

Major efforts have therefore been undertaken to improve the linkage among these three traditionally parallel systems. First, community colleges and business have increasingly undertaken joint activities. Second, certain types of collaboration between economic development initiatives and job training efforts are slowly beginning to occur.[31,32,33]

The Federal programs aimed at improving this linkage, including the activities sponsored by The Job Training Partnership Act (JTPA) and Perkins II are becoming most prominent.[34] This is because both have heavily emphasized a public-private partnership through the work of the Private Industry Councils (PICs), and other vocational education coordinating bodies such as JACs, in which potential private-industry employers have an active role in shaping the job training programs to be supported with public funds. This role of JTPA contrasts to a certain degree with the experiences of JTPA's predecessor, the Comprehensive Employment and Training Act (CETA), which was faulted by employers for having weak outreach to business, poor follow-through on commitments, unreliable funding, too much paperwork, and possibly too complex a set of requirements to be implemented (e.g., the experience with the Youth Employment and Demonstration Projects Act). [35,36]

Instead, the PICs (which had only a minor role under CETA) have helped JTPA to develop a reputation as a "program that works" in which training leads to placement and in which placement rates

and salaries are close to the standards of expectation.[37,38] For instance, an evaluation covering the activities under Title II-A for Program Year 1985 showed that a sample of SDAs had exceeded the U.S. Secretary of Labor's performance standards regarding the number participants entering employment, and that the costs per placement were lower than those in the standards; the average wage for those placed was only slightly below that of the standard.[39]

This second linkage between economic development initiatives and job training efforts is, however, regarded as being rather new, especially for JTPA.[40] The documented examples appear to be few and far between, and little is known about the most effective strategies underlying successful collaboration. Furthermore, some observers have expressed doubt regarding whether JTPA and economic development initiatives can ever be coordinated due to differences in ultimate goals, and so potentially successful examples are even more critical in providing potential answers to the problem.[41]

An Expanded Role for the Community College in Economic Development

The Task Force on the Role of Community Colleges in Economic Development surveyed the nation's community colleges and reported national trends in this broad economic development area.[42] The most significant finding was that the nation's colleges are beginning to re-examine the impact that they have on the economic development of the communities they serve. Over eighty-five percent of the colleges reporting promote their involvement in

economic development. One third have published institutional mission statements referring to economic development.

As a testament to their involvement, forty-seven percent of the responding colleges have a designated economic development specialist on staff, and seventy-seven percent of the colleges encourage faculty involvement in economic development. The study also identified catalytic and diffusion activities of the responding colleges, and documented over 50 projects at colleges nationwide. Credit for some of these catalytic and diffusion activities rests with organizations such as the American Association of Community and Junior Colleges, National Council of Occupational Education and the National Postsecondary Alliance and Sears-Roebuck Foundation (AACJC Keeping America Working Project).

The study indicated that 95% of the responding colleges had established linkages with economic development agencies. In their roles many of the responding colleges offered technical assistance in the forms of management counseling, resource information, and community supported services. Seventy percent of the respondents also provide quick start training for employees of new and expanding business. The study found that throughout the country, colleges are capitalizing on current and future trends for custom in-house education and contract training. Catalytic activities according to this report, consist of community college:

a) linkage with other state and local agencies to support the establishment of new and expanding business and industry;

b) extension of technical assistance to business and industry in the essential managerial functions of planning, organizing, implementing, and controlling; and

c) delivery of job specific entry-level and supplemental customized training including activities such as cooperative apprenticeships.

Variations in the services offered by many colleges are best reflected in:

a) the degree of involvement;

b) whether the involvement is active or passive (such as organizing, coordinating, brokering, consulting, establishing, coordinating vs providing space);

c) whether the involvement should be essentially an internal effort of the college or whether it should concentrate on bridging the gap with already existing economic development efforts;

d) whether the involvement should include personnel or only functions; and

e) whether the college should serve as a catalyst or performer of identified tasks.

There have been several recognized and profitable partnerships in economic development such as the Cascade Business Development Center at Portland (OR) Community College, and The Business and Industry Center at Daytona Beach Community College which should serve as national models. In addition to offering specific training for participating businesses, the colleges offered related

technical services such as technical information research, personnel recruitment, software design, consultation to new and growth-oriented firms, etc. This finding was reiterated in a study of contractual education programs in the California Community Colleges.[43]

Very often joint business-industry and educational collaborations emerge from an immediate need for specific training to solve a particular business need. Such was the case in Rhode Island when The General Dynamics Corp. Electric Boat Division had a need for technicians. The Community College of Rhode Island worked with G-D to produce an apprenticeship program, which later expanded to a business industry center providing customized training for many Rhode Island businesses.[44] A similar situation evolved in Ohio at The Raymond Walters College who entered into an arrangement with The General Electric Corp for specific training. This program expanded to include consultation, credit course work, professional update training, etc.[45]

The community college is often presented with the need to extend its services directly into the business community to provide a multitude of services to a wide variety of business-industry customers, without any one specific sponsor, but rather as a "one-stop storefront."[46] Such was the case at El Paso Community College where services such as community-based short courses, some for credit, others not; walk-in technical assistance for business start-ups, or business-related problems; JTPA sponsored job

training; clearinghouse of business literature; small business resource center; and minority-owned business advice were all provided. A key to success in this program was the matrix link to college faculty and resources. This center also had as a central mission, the selling of El Paso as a community in which to do business, part of the El Paso Chamber of Commerce's economic development activities.

This type of service outreach can extend to multiple organizations operating under one common agreed-upon charter, as is the case in Hawaii.[47] A multiple effort of the Maui Economic Development Board, The County of Maui, The Hawaii University, Honolulu, the Pineapple Growers, the tourism industry, The Honolulu Chamber of Commerce, Maui Community College, and The Hawaii State Department of Economic Development -- this full participatory model of economic cooperation -- was implemented to ensure the economic success of the tourism industry and the tropical fruit growers. This included job training coordination, business recruitment, technical assistance from the institution of higher education, resources from business and industry, etc.

In Summary

What has emerged based on these lessons learned is that effective leadership for linkages in economic development must involve communication and planning between various community based organizations and businesses. Community colleges cannot simply commit themselves to do economic development, but must cause it to

occur asserts Mundhenk[48] and Ohio State University.[49] Through a recognition that economic development is and always has been a part of the community college mission, it is essential to understand and assert that the college's inbetweeness is an advantage. By involving college staff in community development and planning activities and making economic development a broadly shared responsibility, proactive activities such as cooperative apprenticeships can occur. Some suggestions have emerged as a means to accomplish this goal:

- Focus contacts with business and industry and define a market segment and accurately stick to it.
- Find partners in education and in industry and develop flexible programs and approaches such as cooperative apprenticeship.
- Emphasize the college's role in technology transfer as well as in job creation and development and be sensitive to the importance of leverage.

Figure 4-3 presents a synthesis of a model for economic development/job training linkage which appears to offer promise for success. Successful local economic development and employment/job training is dependent on the formation of either formal or very well orchestrated informal linkages of economic development organizations with employment and training organizations. Per Figure 4-3, it appears that the formation of structured organizations provides a viable catalyst for effective

communication through planning and follow-through of goals and objectives. This best takes the form of regional planning bodies for economic development articulating with training and technical services delivery organizations through a coordination body such as a PIC or economic development corporation. In principle, the following discussion highlights the dimensions of the model, their interrelationships, and rationale.

Insert Figure 4-3 about here

Therefore, the present study's primary purpose was to produce new information regarding collaboration involving job training and economic development efforts. The goal was to collect information on innovative practices, defined as those involving interorganizational arrangements with demonstrated exemplary outcomes. The study conclusions are intended to be a rendition of "what works," and "why," with lessons learned for other local sites wishing to consider similar initiatives.

Figure Caption

Figure 4-1. Emerging patterns of collaboration.

EMERGING PATTERNS OF COLLABORATION

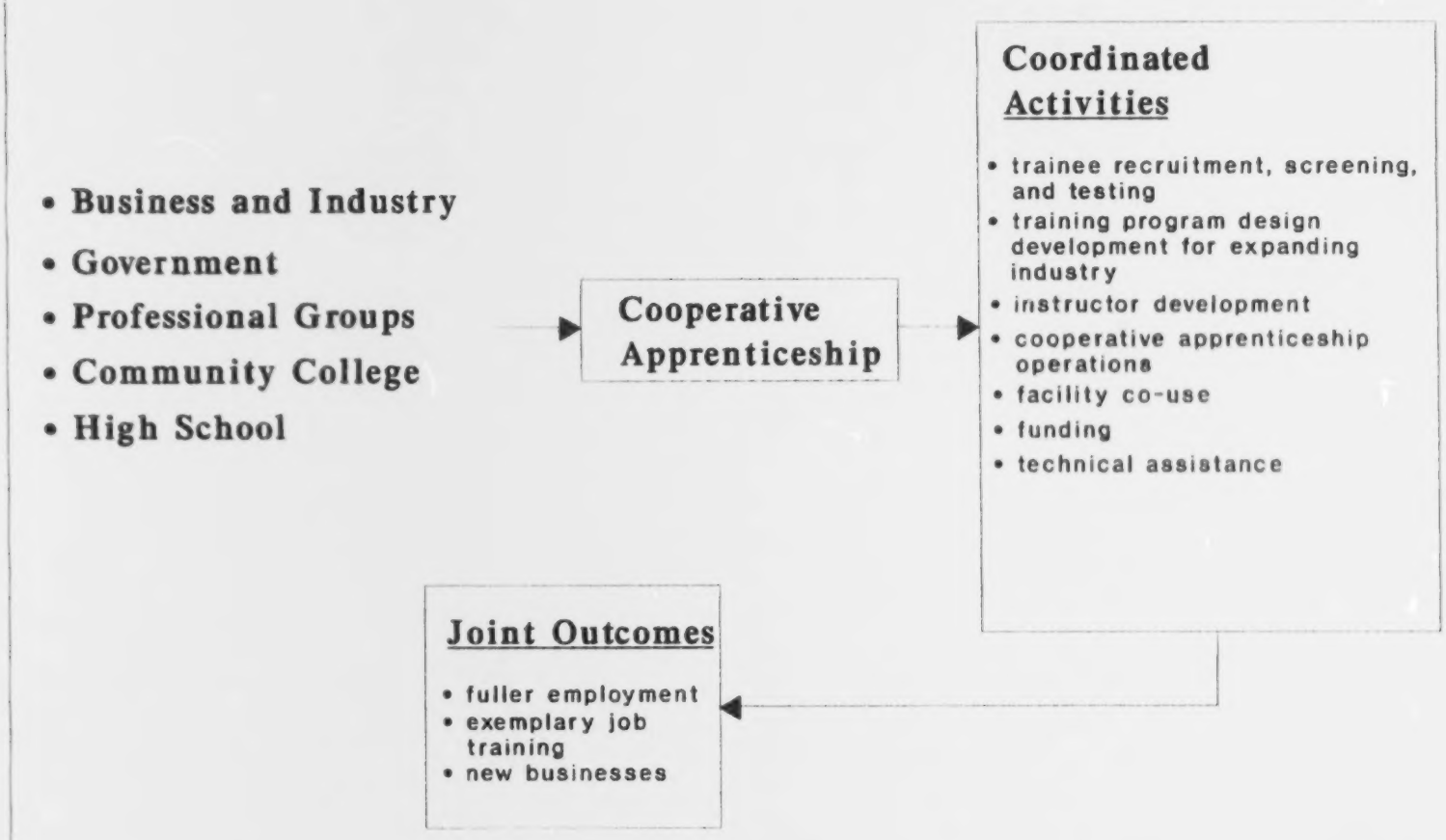


Figure Caption

Figure 4-2. Interorganizational model.

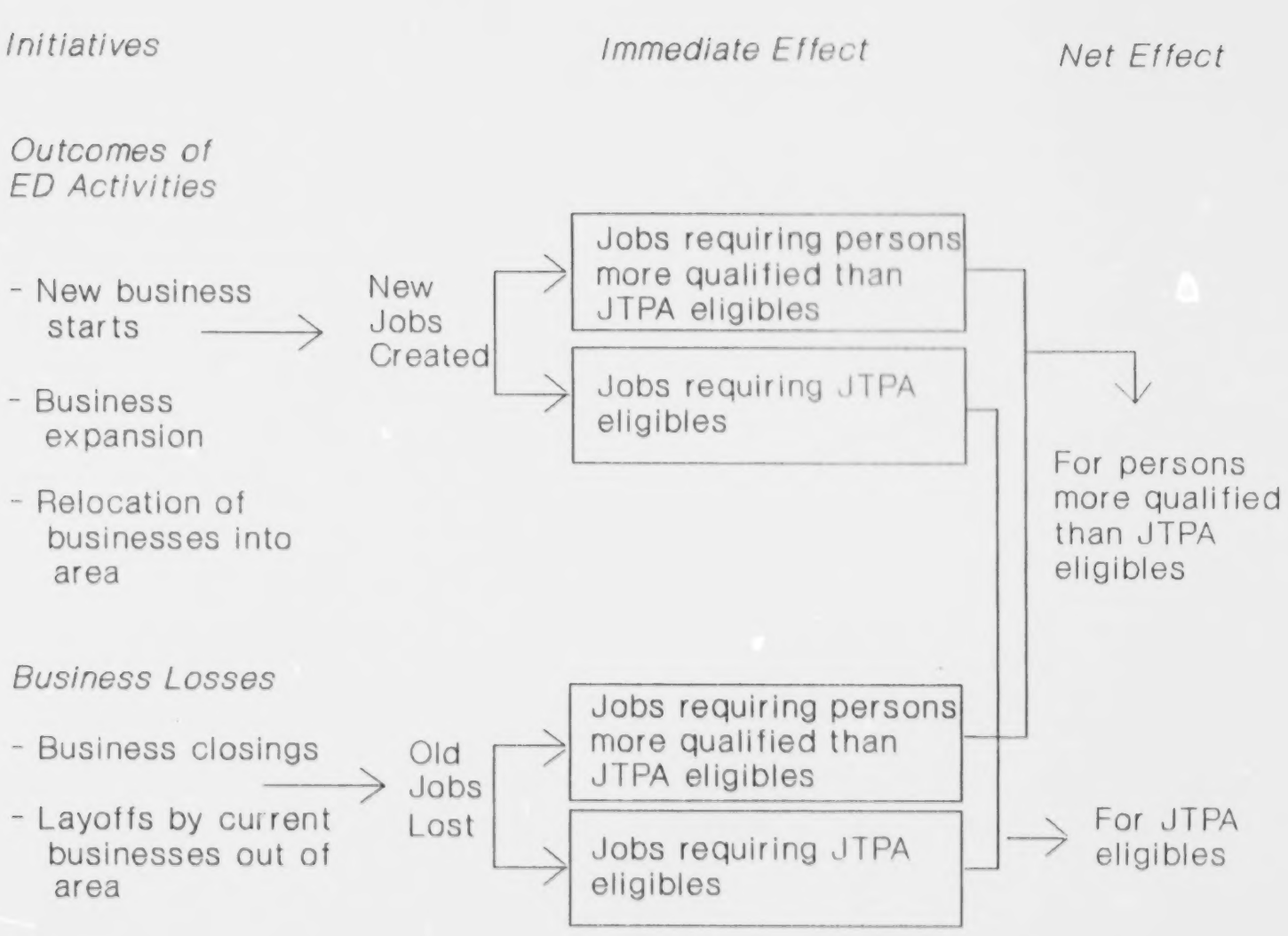
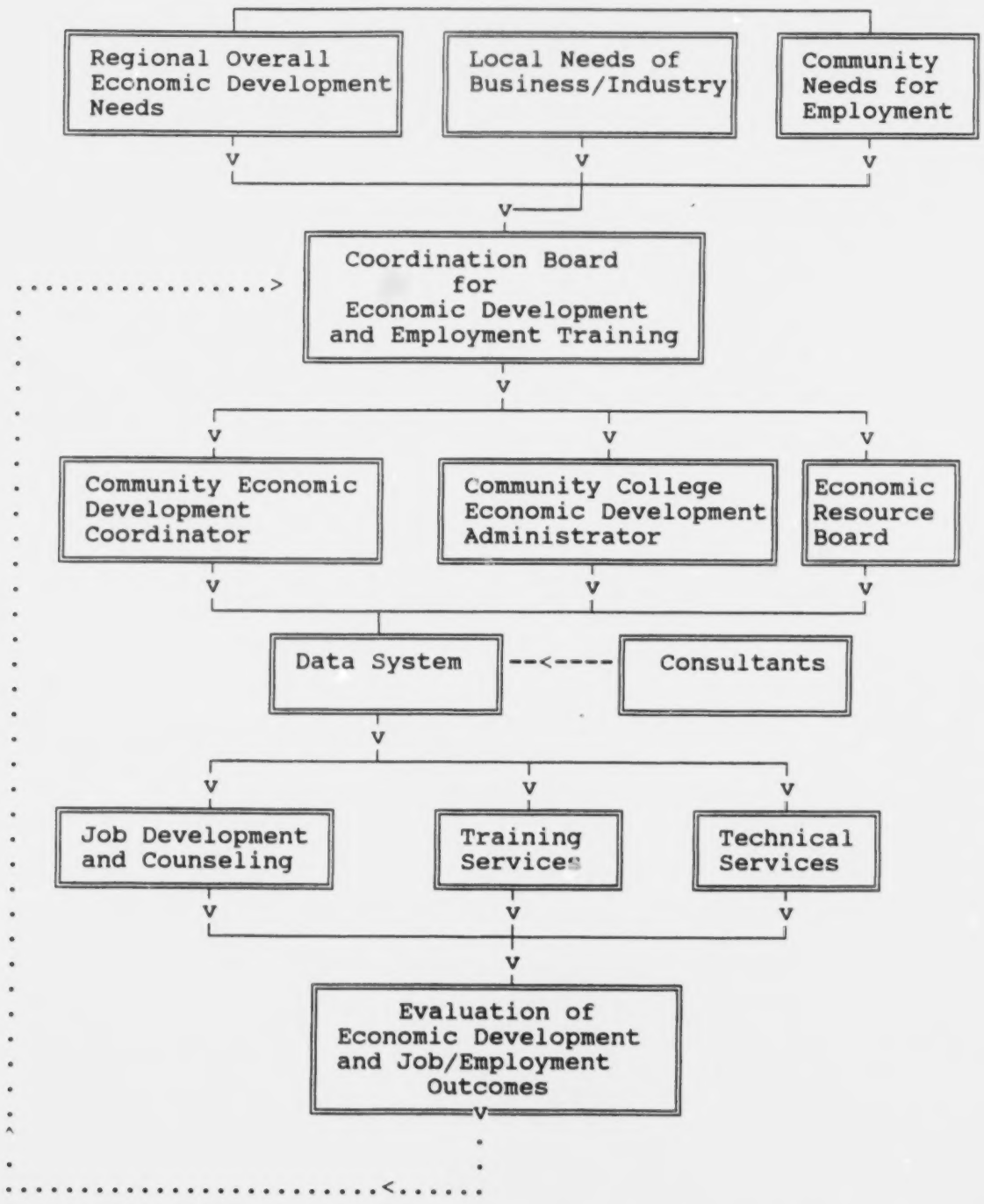

Initiatives
Immediate Effect
Net Effect
Outcomes of ED Activities
- New business starts
- Business expansion
- Relocation of businesses into area
New Jobs Created
Jobs requiring persons more qualified than JTPA eligibles
Jobs requiring JTPA eligibles
For persons more qualified than JTPA eligibles
Business Losses
- Business closings
- Layoffs by current businesses out of area
Old Jobs Lost
Jobs requiring persons more qualified than JTPA eligibles
Jobs requiring JTPA eligibles
For JTPA eligibles

Figure Caption

Figure 4-3. A model for economic development/job training linkage.



Comprehensive Economic Development/Job Training Linkage Model
Figure 3

Endnotes

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Chapter 5

Study Methodology

The Case Study Method

To conduct this study, the case study method was selected as the research process of choice. The case study method is a useful device for systematically identifying and reviewing factors influencing successful linkages, introducing useful new data and perspectives, and providing a structure for the development of policy recommendations. The concept of a "case" enabled the researcher to define the boundaries of an investigation beyond those associated with a single data set or organization. In the study, the case study was drawn around the dependent and independent variables in the linkage model (See Figure 5-1). The case method allowed the phenomenon of inter-organizational collaboration (for achieving linkage) to be studied in context, thereby highlighting the actions and interactions that result in the observed effect(s).

Insert Figure 5-1 about here

The case study method used in the study included these several considerations:

a. research design;

b. quality control procedures for implementing any case study research;

c. data collection plans;

d. strategy for conducting within-case and cross-case analysis; and

e. final report.

These features are described in the paragraphs that follow.[1]

Research Design

The research design centers on the tailored application (enhancement) of a traditional inter-organizational collaboration model (see Figure 5-1). The enhancement, based upon the findings of Thomas' earlier study of apprenticeship linkages with vocational education will produce a comprehensive and updated understanding of the true dynamics of inter-organization collaboration.[2] As a result of enhancing the model, it is possible to hypothesize causes of successful collaboration in a typical business setting, develop robust explanations of successful linkage, and propose recommendations for public policy. Figure 5-2 illustrates how the case study of a single linkage can be structured. The linkage for collaboration model (Figure 5-1) was analyzed in light of new information from on-site reviews of programs, interviews with employees and corporate officials, union officials, training personnel, and community college educators, and analysis of recent similar studies and surveys. The subsequent model is then used to propose any new policy recommendations and initiatives.

Insert Figure 5-2 about here

Quality-Control Procedures

With regard to controlling the quality of research, case study research has traditionally been considered a troublesome method. In general, the quality of the research has been viewed as being dependent upon the strength of the investigators conducting the research.[3] Although this case study caveat for quality control is correct, it does, in fact, apply to all research methodologies. For this study, formal procedures were used to increase the quality of the case study method.

In fact, the use of such formal procedures is especially important when (as in this study) several difficult inter-organizational linkages are examined in parallel. The approach to quality control that will be used in the proposed study emanates from the framework of "test" applicable to all social science research. From the standpoint of "test", all research should meet the following four conditions:

a. construct validity;

b. internal validity;

c. external validity; and

d. reliability.

Figure 5-3 shows the pertinent tactics used in the case study method for dealing with the four conditions.[4] Of note is the fact that these tactics occur throughout the research; e.g., during design, data collection, data analysis, and reporting. Consequently, to avoid problems associated with "quality", the

study used the tactics listed in Figure 5-3 thereby assuring that the completed case studies are of the highest quality.

Insert Figure 5-3 about here

Occupational Areas Analyzed

This project centered upon in-depth interviews, data analyses, and on-site reviews of apprenticeship training in five occupational areas; all involved linkages of employer-sponsored apprenticeships with community colleges. The occupational areas selected included the following: (1) The automotive industry which encompasses manufacturers (both domestic and import); dealers; professional trade associations; technical training associations; and technical-professional certification bodies. The automotive area was selected as it represents a diverse group of professional and business interests both in the U.S. and abroad; has traditionally been a subject taught in the community college; is geographically dispersed; is an area of constant changing and increasing technology; is not controlled by trade unions, but is represented by organized labor in some locales - hence it could offer tremendous insights into the uses and problems associated with dual-enrollments of apprentices in community colleges. (2) The unionized construction and electrical trades industries which is well represented by national organized labor and contractors. This area was chosen as it traditionally has used apprenticeship as a means for training, and now is faced with increasing technology in

most of its job applications; and because it is union represented in both right-to-work states and closed-shop states. Additionally, this area has had uniform national apprenticeship programs operating for several decades -- some with affiliations with higher education. (3) The maritime industry was analyzed as it is represented by both the Federal government and employers in the private sector. It is a geographically dispersed industry, under constant scrutiny, both for critical skills and costs -- all which are critical to the Nation's defense. It is affected by union and non-union personnel concerns, and is under pressure to keep abreast of the latest changing technology. (4) The fire and emergency medical services, as represented at the local, state, and federal levels was also analyzed. Again, both union and non-union programs are operating, in both career and volunteer sectors. A wide range of age groups, demographics representations, and skills are found in these services. Apprenticeship is relatively new to the public services. In each of these occupational areas, changing technologies are apparent; the effects on the workforce of changing demographics is dramatic; as is the need for critical-skills performances essential to job success, and environmental safety. Hence higher education participation in training is needed and essential.

Data Collection Plans and Methodologies

The data collected during the study focused on clusters of dependent, independent, and contextual variables. The data was collected from a wide variety of sources, centering on the

telephone and on-site program reviews (and accompanying interviews) and related data collected about the programs. To collect the data, a technical design plan was developed, and refined for each inter-organizational linkage (e.g., union to apprenticeship). The plan covered:

1. the procedures followed in conducting the on-site review and data collection;
2. the questions answered by the analyst on the basis of testing multiple and converging lines of evidence;
3. the sources of evidence used; and
4. the reporting formats, (tabular and narrative) used in the final case studies.

As described herein, data sources came from both within and outside: (1) the industry; (2) the program; (3) the college; and (4) the union.

Strategy for Conducting Cross-Case Analysis

Although individual case studies provide valuable descriptions of a particular phenomenon, this study also produced a cross-case analysis. This analysis consisted of two approaches. The first approach produced frequencies and cross tabulations of various descriptive aspects of the cases, including stratifiers, contextual variables, independent variables, and dependent variables. Such arraying of the data assists the reader in understanding the diversity of the cases and the degree to which different labor situations are covered by the sample.

The first approach was enhanced by a second approach that consisted of a pattern-matching analysis. Pattern matching calls for the entire "pattern" of a case's experiences to be matched to one or another of the hypotheses that emerge as the study progresses. In this manner, each case is used as if it were a single study (not unlike a single experiment or a single survey), and the multiple cases are matched repeatedly to the same set of theoretical concerns.

The second approach to cross-case analysis is illustrated in Figure 5-4. The figure suggests how multiple-case analysis needs to be done at the "first" level of inference, i.e., from findings to theory. (The most common error is to consider multiple cases at the "second" level of inference, i.e., from sample to universe). If the pattern-matching procedure works well, the overall evidence can provide a strong case for making causal inferences, specifically, that one or other hypothesis accounts for the outcomes in a changing labor market.

Insert Figure 5-4 about here

The second approach can also involve tabulations, although the basic pattern matching occurs through logical argument -- again, not unlike any inferential process that connects scientific findings to theory. However, the tabulations in this situation are targeted to the critical aspects of a pattern; they are not intended to serve as descriptive functions. In this manner, the

second approach is complementary to the first; therefore, the proposed study's cross-case analysis will enhance the overall usefulness of the study.

Workplan

The study consisted of three tasks which were completed over the project period. In the following paragraphs, each research task is described.

Task 1: Evaluate existing programs. The study began by a structured identification of existing programs and subsequent review of the program operation based on available literature and interviews with key personnel. Initially, an attempt was made to identify families of industries which use apprenticeship successfully to train their technical workforces -- and hopefully in non-traditional kinds of occupations -- those which are not usually identified with apprenticeship training. Based on the outcomes of this review, and analysis of existing programs, an identification of five occupational program areas for in-depth on-site review was made. Again, the following industries were identified: (1) Automotive; (2) Electrical & Construction; (3) Maritime; and (4) Fire Service. These industries represented apprenticeship programs which were sponsored by: (1) national and local manufacturers and entrepreneurs both with and without union involvement (Automotive); (2) union-sponsored technical trades -- (Electrical and Construction); (3) the government, unions, and private sectors working cooperatively (Maritime); and (4) non-traditional professionally-sponsored programs (Fire Service).

The study plan was based on the initial development of theoretical models (scenarios) of currently successful apprenticeship programs theorizing the linkage activity. The theoretical models were then based on existing programs and literature describing these programs, and where available, expert opinion. These programs were identified from many geographical locations.

The theoretical models were also based on specific rationale supporting each apprenticeship program's operation (including the roles of the participating people and organizations, and those individuals operating at both state and local joint apprenticeship program (JAC) levels). The models covered the following types of issues:

- the context (setting) or need within which a linkage activity was initiated;
- the array of organizations involved in the linkage activity, including their roles, compatibility, and conflicts;
- linkages with community colleges or other training delivery agencies such as secondary or adult education;
- the goals of the firm or industry association undertaken collaboratively, including their labor organization relationships and other economic/labor initiatives or circumstances;
- the actual activities undertaken, including such items as: training program development,

apprentice recruitment and involvement of JTPA funding sources with other sources (e.g. Perkins, JTPA, Union dues, employer assessment), negotiated labor arrangements, inter-firm agreements;

- o the desired role, if any, of state, federal and other external resources; and
- o the outcomes of such efforts.

The theoretical model also considered various interorganizational constructs and elements as follows:

- o Cooperative apprenticeships - Programs which include this component enable students to work and earn both full or part-time while attending college. Upon graduation from the apprenticeship these students then enter work. These programs aid by motivating students to see the job as it really is -- rather than invest years in college or school training for a job they might not really be interested in or able to perform. They also provide financially poor students meaningful and necessary part-time work. The U.S. Navy has a demonstrated interest in cooperative apprenticeship with community colleges, as have several U.S. and import automotive manufacturers. Tech-Prep programs sponsored by Perkins II funding also supports these kinds of arrangements between community colleges, employers, and secondary schools.

To conceptually review cooperative apprenticeship programs, an understanding of concerns and potential barriers was necessary. Barriers to apprenticeship expressed by employers include fear of training workers, in-house, and then losing them to a competitor.

These circumstances are reflected in relatively small-scale firms in highly competitive industries.[5] Thus, small-scale employers sometimes band together in industry associations, and establish mutually-funded programs, which spread the cost of training over the entire industry. Often apprenticeship financing is done through the association, by assessing employers based on hourly wages of workers employed. A key incentive within the construction industry has been the Davis-Bacon Act of 1931, which mandates that prevailing wages be paid on federally supported construction projects, except for apprentices and trainees (duly registered as such), who may be paid less then full journeyman rates.

A major concern to this project was that a significant number of employers who do sponsor formal training programs which could qualify as apprenticeships, refuse to register the program with the government for various reasons, including the fear of interference into matters of business, and burdensome paperwork.[6] It is in this context that barriers to and facilitators of registered apprenticeships by employers be identified.

It has been demonstrated that employers who sponsor apprentices do so for specific purposes. Employers in industrial kinds of work often express interest in apprenticeship training when such work requires craftsmen in specific identifiable and recognized classifications. Additionally, high-wage craftsmen, such as those in automotive manufacturing, seem more willing to stay with an employer than low-wage, semi-skilled workers.[7]

o Technical/Vocational Education - The American apprenticeship as an institution has unfortunately remained isolated from the other formal educational institutions (such as public-sector secondary and vocational education) for several reasons. In a study of barriers and facilitators to apprenticeship program linkages, Thomas (1982) identified instances of corporate resistance, partly due to failures in secondary and post-secondary vocational education, and partly to education's misunderstanding of apprenticeship.[8] Despite this skepticism on the part of American business, meaningful public-sector classroom-related training services have been and are being provided to apprentices. This fact provides evidence of the potential for meaningful relationships, given appropriate policy incentives.[9,10,11]

The reauthorization of the Carl Perkins Vocational Education and Technology Education Amendments of 1991 provide an opportunity for proponents of Vocational/Technical Education to emphasize the need for a linkage of American industry and public sector training via apprenticeship and Tech-Prep programs. Recognizing the need for U.S. workers to upgrade skills in order for our nation to compete internationally, the legislation includes incentives for linkage to local economic development, and job training strategies including promotion of apprenticeship.[12]

Apprenticeship sponsors agree that Technical Education and apprenticeships can work together. Technical Education does help to channel well-prepared candidates into registered apprenticeships. Technical Education often provides related-

instruction portions of the apprenticeship.[13] To be successful in establishing linkages, workable arrangements for arbitration between Technical Education and apprenticeship need to be developed in a mutually beneficial manner. The key might well be identifying appropriate occupational training categories and identifying qualified and well-prepared applicants. This might also involve pre-apprenticeship preparation for those students needing remediation in basic education.

A motivator to apprenticeship program participation-related instruction, both classroom and laboratory, as provided by public technical education, has always been viewed by both industry and public policy makers as beneficial.[14] A significant portion of related instruction in apprenticeship is conducted in public technical education facilities. Even where private industry facilities are used, part of the instructor's salary is often funded by technical education monies from state, federal and local sources. The Smith-Hughes (1917) and George-Barden (1946) Vocational Education Acts provided for partial reimbursement from federal funds of instructor salaries in states with approved technical plans.

Perkins II provides funding for apprenticeship training. The degree to which this funding is used and the processes used for such linkage vary from state to state. Perkins' monies are used to fund program implementation in both secondary schools and community colleges. The literature is rich with examples of apprenticeship-related instruction being provided through community college

linkages and Perkins' funding.[15] Yet, secondary education continues to experience problems and barriers to effective registered apprenticeship participation with business and industry.

o JTPA Linkages - Job Training Partnership Act (PL 97-300) (JTPA) funding plays an important role in linking apprentice-training with state and local business development initiatives. JTPA funding has been successfully used to support apprenticeship programs. Several maritime programs have also been successful in this regard.[16,17,18]

o State and Local Governments - Renewed interest has developed in state and local government apprenticeship programs as a result of attempts to make maximum use of local resources to develop a trained public work force. This is perhaps one of the most promising areas for use of apprenticeships in workforce training. European governments have used apprenticeships extensively for training government and municipal workers. Within the United States, the City of Boston has employed the apprenticeship for training both police and fire workers. In the state of Maryland, a unique arrangement between the University of Maryland, Maryland State Police and Montgomery County Public Schools has provided training for public service employees. The U.S. Navy's apprenticeship training program for skilled-trades workers is the oldest documented, continuously operating apprenticeship program. Establishment of linkages with community colleges for both related classroom and on-the-job training credits has been very successful in the U.S. Navy.

Multiple-Case Study Design

The articulation of these scenarios lead to the development of a multiple-case study research design, based on a replication methodology.[19] Each scenario was considered as a set of hypotheses or propositions which were confirmed (replicated) or disconfirmed by the ensuing data collection. Ideally, "rival" scenarios were developed, so that at the conclusion of the study one or more collaborative strategies could be recommended for future consideration, and one or more strategies could be rejected as being less promising.

The decision to select a minimum number of sites facilitated the replication design. The primary criteria for site selection was: 1) the successful creation of significant, sustained inter-organizational collaboration for apprenticeship program linkage, and 2) successful program operation. Each site was then studied to determine the collaborative strategies that were pursued to produce these effects, with the inquiry at each site testing the various (previously developed) rival models. As a result, the study has the potential for several replications. If all of the sites followed a similar scenario (and especially if the sites varied according to regional, industrial, and demographic differences), the evidence would provide a strong basis for supporting the use of the same scenario in future efforts. At the same time, the study was designed to uncover any entirely new and unexpected strategies that constituted the driving force(s) behind a particular site's

success. In this way, the study design permitted both theory testing and theory development.

In summary, the objectives of Task 1 were to identify programs linking apprenticeship and community college training programs, reviewing the literature and other pertinent data respective to these programs, and developing a list of programs for on-site review. In doing so, instrumentation for data collection was developed in order to operationalize the study design. The outcomes of this task included an identification and documentation of the existing linkages, an empirical evaluation of their effectiveness, describing the constructs making these linkages effective and workable, and a written report on each linkage detailing the above. The report describes the programs/linkages, why they are considered successful, problems/issues encountered, and funding considerations.

Task 2: Identify Issues and Barriers. The ultimate objective of this study was to recommend facilitators to effective linkages of employer training via apprenticeship with community colleges; i.e., to find what works best in our free economic society, and to identify barriers which might be eliminated through policy and practice changes. The findings of a report issued by the National Center for Research and Vocational Education indicate that American apprenticeship reflects certain strengths and weaknesses, which include the following characteristics:[20]

- Variable quality of training offered. The quality of training offered in apprenticeship is highly variable across trades

and localities. At one extreme, some U.S. apprenticeship programs rank among the best occupational training programs in the world, offering broad, well-rounded training in all aspects of the craft. Others are underfinanced, semi-structured, or rigidly tradition-bound with obsolete curricula.

- Inadequacies in administration of the apprenticeship. As a voluntary partnership between labor and management, between private industry and public agencies, between departments of labor and departments of education or Technical Education or between the federal government and the states, apprenticeship often exists without clear leadership.

- Inadequate numbers of workers trained. American apprenticeship opportunity tends to produce inadequate numbers of skilled workers. This results in part from fluctuations in labor market conditions, the high costs of apprenticeship and the lack of financial incentives for employers.

- Concerns about the cost-effectiveness of apprenticeship. Apprenticeship training is perceived by many employers to be an expensive proposition that does not pay off. This may be one of the underlying causes of the alleged inadequacies in the number of personnel trained through apprenticeship.

- Inadequate financing for certain apprenticeship programs. During periods of prosperity certain apprenticeship programs in the U.S. are well financed, especially some of the programs that are jointly administered by employers and unions. However, recessions adversely affect funding for most apprenticeship programs, and

numerous programs are simply underfinanced all of the time. Funding from vocational education and other public sources varies considerably from state to state and over time. Yet apprenticeship advocates in the private sector are reluctant to endorse expanded public financing of apprenticeship, fearing that increased public control of apprenticeship will accompany the funding.

- Limited access to apprenticeship. Effective equity in access to apprenticeship has been a problem in the U.S. As profit maximizes, employers tend to hire those whom they perceive to be the fastest learners or those who will best fit the jobs. While most sponsors of apprenticeship see apprenticeship training as a regular cost of doing business, few include remedial training as a normal part of an industry's responsibilities. This viewpoint can lead to exclusion of the disadvantaged, handicapped, young or aged, or otherwise non-traditional opportunities - the target populations for the U.S. labor pool per Workforce 2000.

- Unclear role and relationship to other training. Because the role of apprenticeship in the American "non-system" of training is ambiguous, its relationship to other training has been obscured and left to chance and local circumstances. For example, it is not clear what role, if any, apprenticeship should play in providing a remedy to teenage unemployment.

Barriers to Linkage

Thomas identified certain barriers persistent in a cross-section of Florida business and industry sponsoring apprenticeships with secondary vocational education. These include:[21]

a. budgeting problems for business, especially those working on a labor cost basis with their customers;
b. organizational problems, including long-range planning which often precluded the sponsoring of an apprentice unless planned into the operational budget well in advance;
c. company operating procedures which often do not provide for apprentice labor;
d. legal semantics and interpersonal problems between vocational education, local and state governments and the firm or business;
e. actual program preparation and implementation inertia;
f. pay differentials between apprentices and the non-apprentice entry-level counterparts which cause difficulties in keeping apprentices satisfied and attracting apprentices willing to indenture themselves for a fixed period of time;
g. program length, which becomes prohibitive to both business and the apprentice;
h. school credit for on-the-job apprenticeships, which costs the employer money not directly related to the job training;
i. selection of apprentices, which often reflects favoritism; and
j. quality of instruction.

Facilitators to Linkage

Thomas also identified circumstances which promoted successful linkages between secondary vocational education and apprenticeships. Among these are:

a. a common basis for exchange, which might be an occupational craft committee serving a school or community college program;
b. mutual benefits to be derived for both the school and the business or industry;
c. mutual awareness of the program's goals and the expectations of the apprenticeship program;
d. mutual respect, confidence, and trust of all parties concerned;
e. access to facilities, students, instructors, and funding;
f. planned and structured communication throughout the program;
g. similarity of attributes, goals, and values of the vocational program and the business or industry;
h. opportunity to participate and benefit;

i. incentive to participate; and
j. key people on both sides dedicated to the program's success.

Use of Study Data

Based upon the on-site reviews and data analyses, Task 2 included an identification of concerns, issues, and barriers of any nature that will need to be addressed or overcome to expand linkages or implement linkages in the various industries and localities. During the on-site reviews, any specific persons, circumstances, or conditions that were found to create problems or concerns in replicating the linkage were identified. Particular attention was directed to identification of initiatives aimed at the young working poor and the methods in place to re-educate them and/or provide any additional skills necessary for job success.

Task 3: Develop Policy Recommendations and Guidelines for Preliminary Model Plan. Based upon the on-site reviews (Task 1) the analyses of these data, and the identification of issues and barriers (Task 2), a set of policy and practice recommendations and guidelines for a model were prepared describing recommendations for the development or expansion of linkages by labor and industry and the community college. Also guidelines and suggestions are made for potential implementation of such a model (see Chapter 10).

Proposed elements for the model include components for a structured process that would provide training in a substantive skill (or set of skills) in combination with related classroom instruction. The program would be accorded recognition by an

industry or firm or a body beyond the training firm. The recognition might be in the form of certification from an industry-sanctioned body, licensing by a regulating body, or some other organized process for recognition, such as "journeyman statue." Accordingly, one component of the model, should be the certification of acquired skills through the award of recognized credentials. Another component of the model provides a mechanism that grants credit for previously attained skills. It is a necessary component for such a model (as identified in all of the literature researched to date).

Figure Caption

Figure 5-1. Hypothesized linkage model.

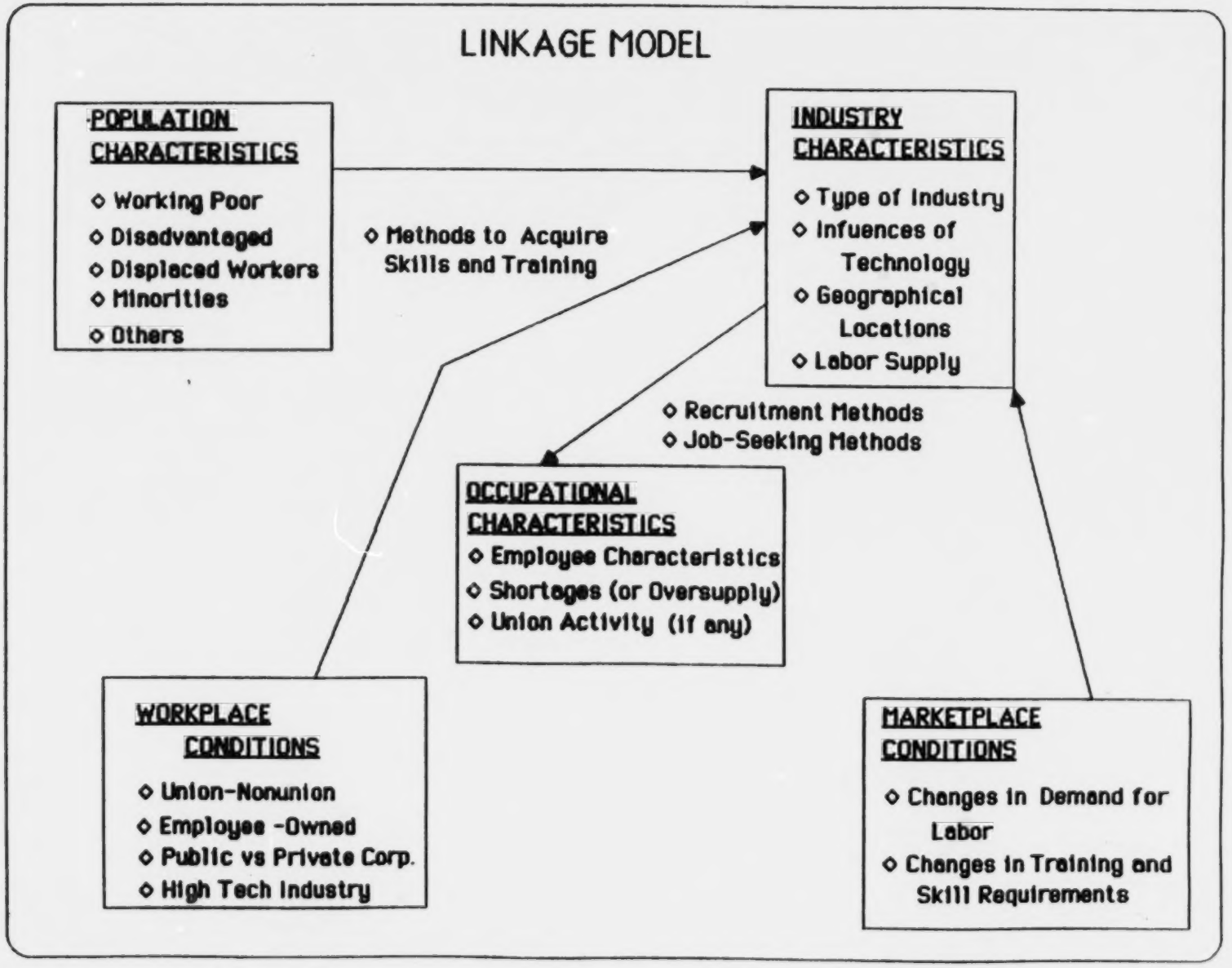
LINKAGE MODEL
POPULATION CHARACTERISTICS
◇ Working Poor
◇ Disadvantaged
◇ Displaced Workers
◇ Minorities
◇ Others
◇ Methods to Acquire Skills and Training
INDUSTRY CHARACTERISTICS
◇ Type of Industry
◇ Influences of Technology
◇ Geographical Locations
◇ Labor Supply
◇ Recruitment Methods
◇ Job-Seeking Methods
OCCUPATIONAL CHARACTERISTICS
◇ Employee Characteristics
◇ Shortages (or Oversupply)
◇ Union Activity (if any)
WORKPLACE CONDITIONS
◇ Union-Nonunion
◇ Employee -Owned
◇ Public vs Private Corp.
◇ High Tech Industry
MARKETPLACE CONDITIONS
◇ Changes in Demand for Labor
◇ Changes in Training and Skill Requirements

Figure Caption

Figure 5-2. How the case study of a single linkage can be structured.

CASE STUDY OF APPRENTICESHIP LINKAGE

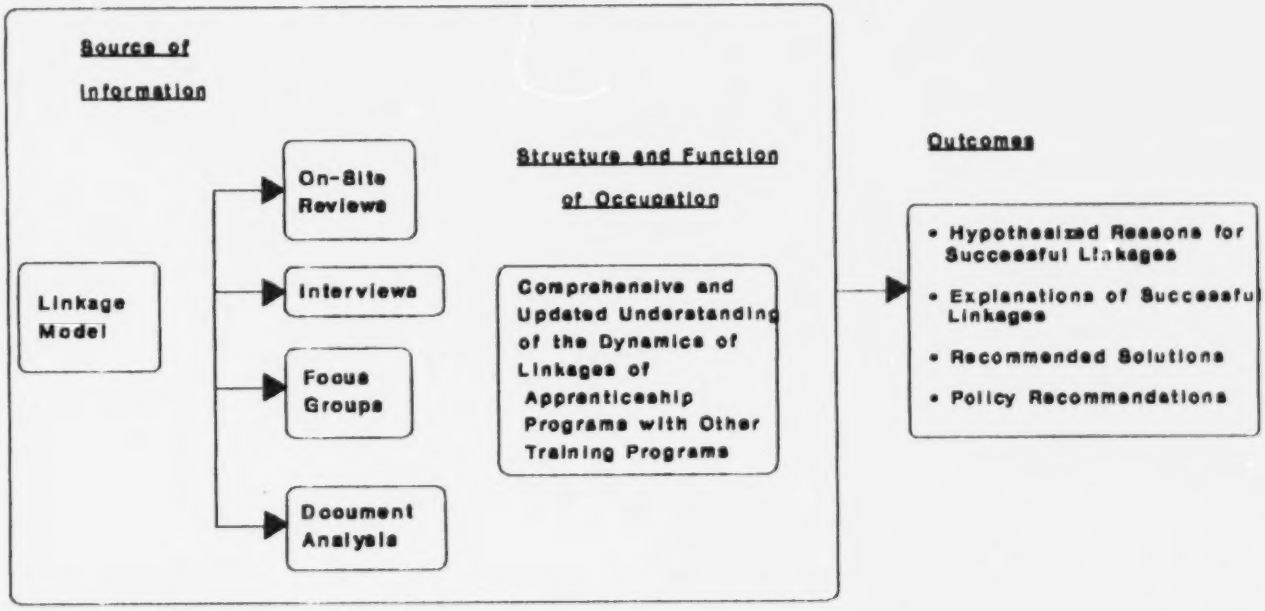

Figure Caption

Figure 5-3. The pertinent tactics used in the case study method.

QUALITY CONTROL PROCEDURES IN CONDUCTING CASE STUDY RESEARCH

Tests	Case Study Tactic	Phase of Research in Which Tactic Occurs
Construct validity	• use multiple soirces of evidence • establish chain of evidence • have key informants review draft case study report	data collection data collection data collection
Internal validity	• do pattern-matching • do explanation-building • do time-series analysis	data analysis data analysis data analysis
External validity	• use replication logic in multiple case studies	research design
Reliability	• use case study protocol • develop case study data base	data collection data collection

Figure Caption

Figure 5-4. The approach to cross-case analysis.

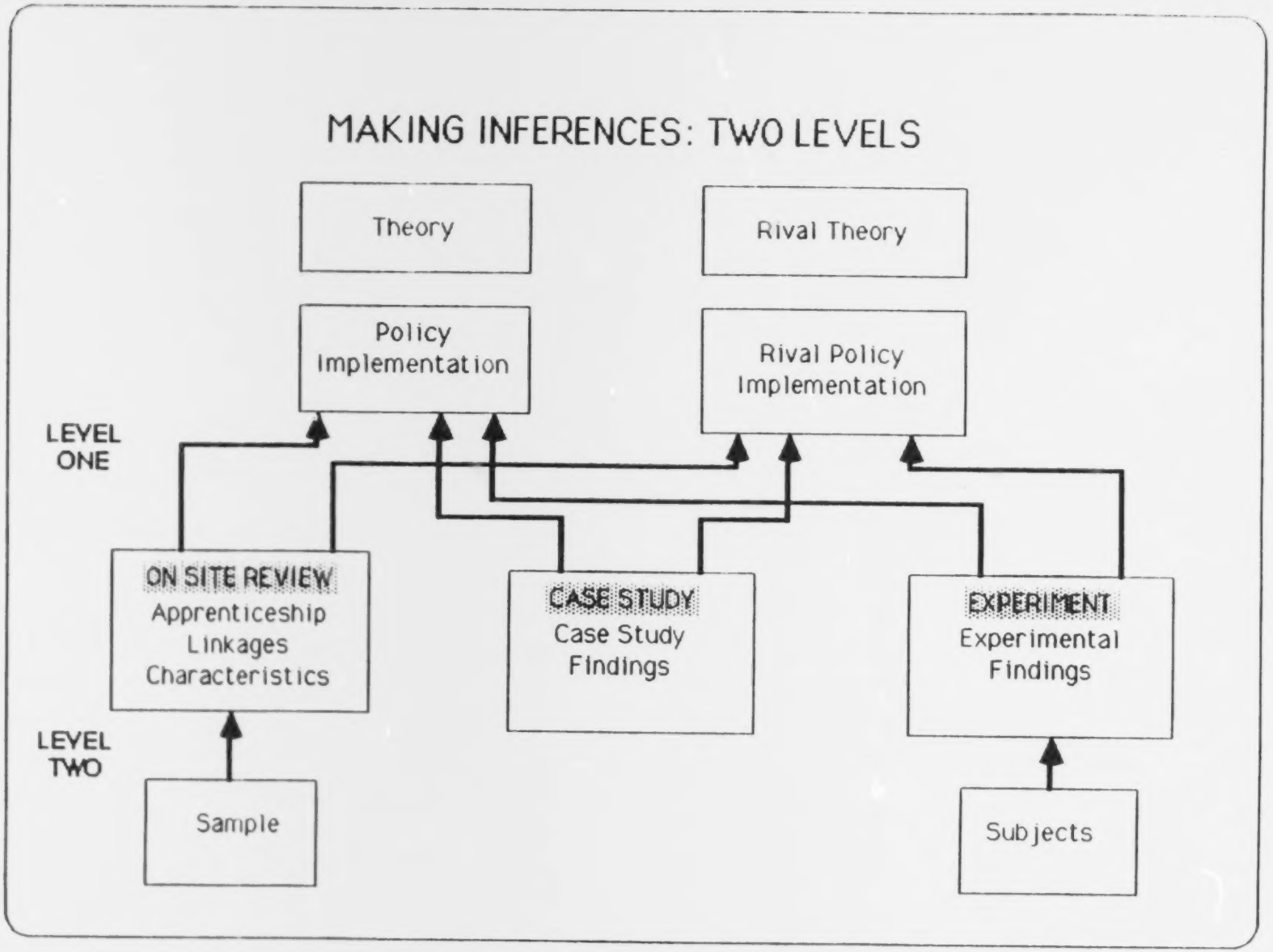
MAKING INFERENCES: TWO LEVELS
Theory
Rival Theory
Policy Implementation
Rival Policy Implementation
LEVEL ONE
ON SITE REVIEW
Apprenticeship
Linkages
Characteristics
CASE STUDY
Case Study
Findings
EXPERIMENT
Experimental
Findings
LEVEL TWO
Sample
Subjects

Figure 4

Endnotes

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18. see: Cantor, J.A. (1986, June), ibid.

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20. see: Glover, R.W. (1986). Apprenticeship lessons from abroad. Center for the Study of Human Resources, University of Texas at Austin, Columbus Ohio: Ohio State University, National Center for Research in Vocational Education.

21. Thomas, H.B. (1982), ibid.

CHAPTER 6

Apprenticeships & Community Colleges: The Automotive Industry's New Model

An Industry Initiative

Car companies and community college collaborate to provide high-technology training.[1] The U.S. automotive industry -- domestic and import vehicle manufacturers, retail car dealerships, dealer trade associations, labor unions and after-market suppliers -- has successfully adopted cooperative apprenticeship as a training process. The concept links community colleges and some secondary vocational-technical schools with local auto dealers, their trade associations, vehicle manufacturers and independent repair garages.[2]

As early as 1970 the National Automobile Dealers Association (NADA) recognized that changing automotive technology created a need for more technically skilled mechanics to repair and maintain newer model cars. NADA designed an automotive technician apprenticeship program that was implemented through selected community colleges around the country.

This program included 6,000 hours of apprenticeship instruction in a participating auto dealership under the direction of a master technician. The apprentice also attended a participating community college in the evening, several times a week, over a period of three years. College work included general academic, business management and automotive-related courses leading to an Associates Degree in automotive service and

management technology. The apprentice also received college credit for the supervised cooperative work at the dealership.

Manufacturers' Programs

Over the last decade, the major automotive manufacturers have set up their own cooperative programs with community colleges. Not all of these programs are called cooperative apprenticeship; yet in almost all respects they bear all of the attributes of an apprenticeship.

The car companies believe that by attaining an Associate Degree, a technician will have a desirable general and technical education and will have mastered vital communications, business management knowledge and diagnostic problem solving skills that are requisites for dealing successfully with customers.[3]

General Motors Corp. GM developed its Automotive Service Educational Program (ASEP) in response to continued changing technology and the need for increased customer satisfaction with maintenance and service. Also, GM needed to provide more accessible and cost effective in-service training for technicians in its 10,000 plus dealer network.[4]

GM also has contracted with some of the participating colleges to serve as regional satellite training centers for local dealers' personnel. This enhances the contact between the college's staff and instructors and the auto dealership people and can help the college to place students in apprenticeships and full-time jobs.

Ford Motor Co. Ford's cooperative apprenticeship program, called "ASSET", began in 1985 at Broward Community College in

Florida. There have been 850 ASSET program graduates to date. Ford provides automotive curriculum materials, vehicle components and training for college instructors. Much of the emphasis in the curriculum is on electronics. Ford also contracts with the colleges for in-service training for dealer technicians.

Toyota Motor Corp. In 1980, Toyota initiated a cooperative program called T-TEN, to support its dealers with improved training for entry-level technicians. More than 800 students have graduated from the T-TEN apprenticeship at 63 participating colleges.[5]

Chrysler Motor Corp. Chrysler's PROCAP program is similar in many respects to the GM and Ford programs.

Nissan Motor Corp. Nissan also supports a PROCAP program.

The Recreation Vehicle Industry Assocaiton initiated a national training program in February of 1989.[6] This program involves 20 recreational suppliers and many dealerships, nationwide.

The Community College Role

The cooperative apprenticeship idea is a new twist on cooperative education and work-based learning programs. At the same time, it bears a strong resemblance to traditional apprenticeship. In both there is a system of formal structured training, the student earns a realistic wage, the employer makes a long-term commitment to the student and the training is for a defined period of time.

Many community colleges have joined with one or more manufacturers to operate cooperative apprenticeship programs in

automotive technology. The National Association of College Automotive Teachers (NACAT) estimates that there are about 500 such programs operating throughout the U.S. and Canada. For example, Shoreline Community College, Seattle has offered automotive cooperative apprenticeship programs for more than 15 years. It currently operates GM-ASEP, Toyota T-TEN, and Honda programs. The college serves a community with more than 200 car dealers, and 16,000 automotive industry employees in the area. Among other exemplary programs are these:

Monroe Community College, Rochester, New York with a generic NADA program, plus those tied to Toyota, GM and NISSAN. Rockland Community College in Nyack, New York -- Chrysler PROCAPS program. Massachusetts Bay Community College in Boston -- Toyota T-TEN program and GM ASEP programs. Brookhaven College in Dallas -- participating with Ford, GM, and Nissan. Tarrant County Community College in Ft. Worth, Texas -- an Independent Service Association (ASA) apprenticeship program that serves independent garages and repair facilities, plus a NADA Program for new car dealers.

Central Piedmont Community College in North Carolina -- GM ASEP, Toyota T-TEN and a generic program. Bessemer College in Alabama -- ASEP, T-TEN, and Ford ASSET programs leading to both Associates Degrees and certificates. El Camino College in Via Torrance, California -- Nissan, Toyota, GM, Ford, Chrysler, and Honda programs leading to Associates Degrees and certificates. Rio Hondo College in Whittier, California -- Mazda and Honda programs.

North Iowa Area Community College, Mason City, and Winnebago Industries operates the Recreation Vehicle Training Program.

How The Programs Operate

Most of the auto industry cooperative apprenticeship programs are designed around the following elements:

Manufacturer-Oriented Curriculum

GMs ASEP was developed in cooperation with over 50 community colleges nationwide. All participating manufacturers want to work with a college to integrate their materials into the automotive curriculum. For example, in Toyota's T-TEN program, an automotive engines course at a participating college focuses on Toyota technology, and Toyota products are used in laboratory sessions. At many colleges, courses are condensed into shorter time frames to allow time for the cooperative work experience part of the program. Many of these programs also involve student organizations such as VICA in the apprenticeship programs.

Program Quality Control

Most manufacturers want the automotive technical education programs they participate in to be certified by the National Automotive Technology Educational Foundation (NATEF). They view NATEF certification as a benchmark of the program's state-of-the-art excellence. To win certification a college program must meet rigorous standards and pass an on-site review in nine subject areas. About half of GM ASEP schools and all Toyota T-TEN schools are certified.

The manufacturers also want dedicated and trained instructors and will support the training in these programs. NATEF awards Automotive Service Excellence (ASE) certification to instructors who can demonstrate competence in eight basic service areas.

A Cooperative Format

Most participating colleges offer an alternating course of study that has an apprentice in college classes full time for one semester or quarter, then working full time at a dealership for the next semester or quarter. Some of the colleges use a pattern of 8 to 9 weeks in school and 8 to 9 weeks on the job.

The auto companies usually have preferences about the specific amount of time devoted to each phase. GM likes course sections in 8 to 10 week periods, with the entire program completed in 90 weeks. Ford prefers 8 to 12 weeks in each phase. NADA programs consist of 6,000 hours of full-time apprenticeship work over three years, with the apprentice attending courses in the evenings.

In all cases participating dealers assign a qualified supervisor to monitor the apprentice's progress. Often the apprenticeship will rotate through the dealership working with several master technicians and department managers in various specialty areas.

College Credit for Workplace Experience

Credit earned for the apprenticeship portion of the program ranges from 6 to 12 semester hours. NADA program participants receive six semester hours per semester for on-the-job training and

work. The National Recreational Vehicle Program is a 35 credit hour coperative program.

Top Notch Facilities

All the manufacturers require that a college's facilities meet their standards before they will enter into an agreement to sponsor a program. Many manufacturers provide substantial grants to help the colleges develop and improve their auto training facilities.

Articulation

Several colleges have articulation agreements with four-year institutions that facilitate student transfers to a Bachelor's program after receipt of an Associates Degree. For example, Bessemer College has such agreements with Auburn University, Athens State College, and the University of Alabama. Brookhaven College has an agreement with the University of North Texas, which will accept up to 60 semester hours of the Brookhaven program.

Other Assistance from Industry

The auto industry helps colleges and students in other ways, too.

Recruitment of Students

In every manufacturer cooperative apprenticeship program the student must be sponsored and employed in a dealership in order to participate. Toyota and other companies assist the colleges in recruiting students for these programs with such things as public service announcements aired on local radio and TV stations and announcements through their dealers.

Monroe Community College and Massachusetts Bay Community College sponsor career days, high school mailings, open houses, competitions with high school students, and activities with dealers. Westchester and Rockland Community Colleges participate with the New York Area Dealers Association in an annual association promotion.

Financial Incentives for Students

An added incentive for colleges to participate in a cooperative apprenticeship program is the array of student financial supports provided by the manufacturers.

For example, Chrysler Corp provides $1500 per apprentice toward the costs of the student's education, and the participating Chrysler dealer must pay the apprentice 160% of its minimum wage, with 50 cents per hour raises each semester that the student remains in the apprenticeship program. The dealer places an additional $1.00 per hour in escrow and given it to the apprentice as a bonus upon graduation. The dealer also must agree to a two-year job commitment to the apprentice at the outset.

Toyota provides students accepted in the program with $500 scholarships for college tuition (more for students in certain minority status categories); a $1500 basic tool set from Snap-on Tool Corporation for use in training (the student gets to keep the set upon graduation); reimbursement for the cost of ASE certification. Toyota will also award a technician advanced standing in its own certification program for work successfully completed in a T-TEN program. Sixty-three colleges participate in

the Toyota program, from which 809 technicians have graduated with Associates degrees since 1986.

Honda will cover 50 percent of an apprenticeship student's college tuition, with participating dealers paying an allowance of $750 per student for initial tools.

Ford will pay for a student's ASE Certification test. GM requires students to pay for tuition; however some of GM's dealerships provide tuition support for students as do some local trade associations.

Other Resources

Manufacturers commonly donate equipment, training aids and materials to participating colleges. GM reports that its donations in vehicles, tools and parts total $20 million a year on average.

Manufacturers also provide training and development programs for college instructors, often during their summer break periods. Ford sends college instructors to its corporate training school six times a year. GM has a similar program and sees this as a form of technology transfer from corporation to community.

In addition GM, Ford, and other manufacturers have arrangements with the colleges to train other dealership personnel. This relationship can bring the colleges new financial and technology resources as well as new pools of potential students for other academic courses and programs.

How Programs are Developed

The key to developing cooperative apprenticeship programs is the creation of inter-organizational relationships among participating colleges, individual businesses, trade associations and manufacturers. Here are some of the ways formal linkages and working relationships can be established.

Advisory Committees

Most of the colleges have multiple advisory committees; usually one for each of their manufacturer's programs, plus one for any generic automotive technology program they operate. These committees provide coordination among the college and participating car dealers, manufacturers, dealership technicians, and community organizations and students in the program.

Manufacturers' cooperative training program representatives who have backgrounds in automotive service training may visit the colleges regularly and serve as liaison between the company, its dealers and the schools. They may also sit on the college advisory committees. Manufacturers take these interorganizational relationships very seriously.

Trade Associations

Another form of college and auto dealer linkage is through local automobile dealers associations. For example, Monroe Community College works with the Rochester Area Dealers Association (RADA) to place students with dealerships, and to assess dealers' future personnel and training needs. The college also conducts special courses in dealer management topics for RADA.

Shoreline Community College works closely with the Puget Sound Auto Dealers Association (PSADA). The college houses the offices of PSADA on its campus and provides credit and non-credit training programs in cooperation with PSADA which is represented on the college's automotive advisory committee. This partnership has continued for more than 15 years. The college and PSADA will soon open a "model dealership" where students and dealer employees take advanced training and other courses.

Professional Associations

An interesting outgrowth of the cooperative apprenticeship movement is the National Association of College Automotive Teachers (NACAT) whose membership now numbers about 800 instructors and manufacturer-specific associations such as the GM National Association of ASEP Programs and the Toyota College Instructors Group. These associations provide opportunities for their members to discuss automotive instructional issues, such as cooperative apprenticeships, and build links between college instructors and manufacturers.

Summary

Cooperatively sponsored apprenticeships between community colleges and business and industry offer much promise in bringing these two groups together to meet community needs and goals. Additionally, businesses can better control the training received by their employees. The student is able to earn and learn. The colleges in turn can maximize scarce resources and provide state-

of-the-art training to their students. Thus the end result is a "win-win" situation for the student.

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CHAPTER 7

Organized Labor, Apprenticeships, and Community College Degrees: An Emerging Partnership

Organized labor currently represents 16 million workers nationally, down approximately 6 million over the last decade, with a marked decline in union membership, and a corresponding shrinking of political strength across the legislative and socio-political milieus. A concern of organized labor (and also of American business and industry) is to identify a more effective and appropriate means for attracting, training, and educating a workforce approaching the 21st Century. This concern is underscored by changing worker demographics, a shrinking pool of workers from which to draw, and severe literacy problems among American workers. Increasing workplace technological requirements are mandating an equivalent of two years of post-high school education and training for those workers in many technologically-oriented jobs.

Cooperative Apprenticeship

Community college apprentice dual enrollment is not new to union-sponsored training. What is new is a move towards a trainee earning credit towards an Associate Degree. This chapter looks at programs sponsored by: (1) The International Union of Operating Engineers (IUOE) and their locals nationwide; and (2) The International Brotherhood of Electrical Workers (IBEW) Local # 3, Flushing, New York.

How the Programs Operate

Union-Developed Curriculum

In each of these several cases reviewed, Associate Degree programs were initiated by the trade unions and employers in cooperation with the community colleges to best meet current and future needs of their respective contractor firms for well trained and educated workers. Some of the outcomes thus far are exemplary in terms of objectives met, and the additional and unanticipated benefits gleaned to all parties concerned.

A Collaborative Format

Apprenticeship traditionally involves partnerships of contractors-employers and unions, sometimes the government and/or the other community-based organizations (i.e. Private Industry Councils). Organized labor's interest in dual-enrollment processes for apprentice training in cooperation with community colleges dates back to the mid-1970s, with IBEW and IUOE developed programs.[1,2,3] IBEW collaborates its program with The Harry Van Arsdale School for Labor Studies at Empire State College, New York City. New employees hired by employers who are covered by the Local No. 3 collective bargaining agreement enter into a four-year apprenticeship which is offered in cooperation with Empire State College, leading to an Associate Degree in Labor Studies. Similar arrangements are in place with IUOE and several community colleges nationwide.

Program Quality Control

From a collective bargaining perspective, issues of corporate investments in job skills development are forms of job security. By controlling the kinds of training, degree of specificity, and numbers of trainees, unions maximize their ability to attract and maintain contracts and keep their members versatile and adaptable to work changes.[4] It also serves to prevent substitution of low-wage workers for journeyman workers. Dual-enrollment programs also become training grounds for tomorrow's union leaders.[5] Apprenticeship becomes even more attractive as a training process when organized labor and employers can reap the benefits of a community college to: (1) operate the program; (2) provide complimentary technical and general education; (3) provide student recruitment, screening, testing and remedial education; (4) recruit and train trades instructors; and (5) access external funding to operate the programs.[6]

College Credit for Workplace Experience

Additionally, the community college can grant credit for the program, including the apprenticeship portions, and confer college degrees for program completion. What does each of the partners bring to, and derive from this partnership, in order to facilitate such a working relationship?

The Programs-An Overview

Neither of the two national unions which served as the basis for this case study sponsor programs directly; rather local autonomy permits each local to develop a program to meet its

workers' needs. IBEW operates 92 apprenticeship training programs nationwide, in cooperation with community-technical colleges. IBEW Local #3 is its largest local -- of the largest union in the world. The local represents electrical workers employed by approximately 300 employers in the five boroughs of New York City. The IBEW Local #3 Apprenticeship Program is a unique degree-earning apprenticeship program operated jointly by the Harry Van Arsdale School of Labor Studies of Empire State College of the State University of New York. The program is the single entry point for a worker covered under the Local #3 Collective Bargaining Agreement.

Likewise, the International Union of Operating Engineers (IUOE), representing heavy equipment operating engineers in the construction industries, supports dual-degree apprenticeship programs across the nation. IUOE initiated dual-enrollment apprenticeship training Associate Degree programs in twenty states beginning in the late 1970s; at that time involving 2,300 apprentices. By 1975 there were 53 programs in 20 states operating nationally based on an IUOE master curriculum plan.

Rationale for Collaboration with the Community College

In the fall of 1977 Local #3's leadership ventured forward with an idea promoted by one of its most dynamic leaders, Harry Van Arsdale -- to have new apprentices in the construction electricians division of the local complete an Associate Degree in Labor Studies as part of their apprenticeship training. This decision to add such a requirement, and the accompanying effort to implement the

educational innovation, was unparalleled in the history of organized labor and apprenticeship training.

Why such a requirement? First, Local #3 and its employer - contractors via their representative body, the National Electrical Contractor's Association (NECA) view a commitment to education as a well established tradition in the labor movement. Additionally, the philosophical commitment to the apprenticeship program and to higher education and the Associate Degree was so strong at that time, that the union leadership established the degree program as mandatory in order to serve both the union's and industry's needs. This program was seen as an extension of a deep and well-established involvement in education. Its contract with the NECA specifies that one (1) percent of the weekly production payroll be remitted to an educational trust fund. Second, the local leadership viewed the need to raise the educational level of working people, thus improving their social status and self-esteem, -- and that of all workers as well. They foresaw payoffs for organized labor by impacting positively on the qualifications and characteristics of the bargaining unit, thus they believed, strategically positioning labor for better union wage packages in collective bargaining.

Next, Local #3's leadership believes that a union concerned about their own public image has a stake in educating both the public and their members about the labor movement. (Eighteen credits of the Associate Degree program for apprentices is in Labor Studies). Better educated apprentices make better union members --

sympathetic to the cause: an argument touted for the program. Finally, as Mansios put it, "A labor studies program stimulates an active interest in social, economic, and political issues; and it develops a sense of social conscious, community responsibility, and political action" (p. 164).[7] In all, this college program is part of a total package including technical skills training, a job in the trade, membership in the union; and career mobility.

The IUOE Locals

For the purposes of this study IUOE's national office nominated six locals for analysis. Each local has an apprenticeship coordinator who interfaces with a Joint Apprenticeship Training Committee (JATC). Table 7-1 lists the IUOE locals reviewed, including: (1) number of apprentices in each program; and (2) methods used to validate on-the-job credits. These programs vary considerably in dual-enrollment program involvement, and in levels of local union participation.

Yes IUOE leadership believes that a parallel exists between the technical knowledge and educational discipline required of an indentured apprentice in the operating engineer trades, and the knowledge required of an undergraduate student in the first two years of study. Like most high technology industries, rapid technological changes in equipment and building processes necessitate better trained personnel in the operating engineer trades. IUOE does view these programs as a means to help

Table 7-1

The Union Local's Involvement with Dual-Enrollment Programs

Union Local (State)	National Affiliation	Number of Apprentices Annually	Method for Granting College Credit
3 (WA)	IUOE	60	1 credit granted can challenge individual courses
37 (MD)	IUOE	30	Written Agreement
66 (PA)	IUOE	200	Written Agreement
57 (RI)	IUOE	38	ACE/LEAP Program Petition to College
428 (AZ)	IUOE	65	Written Agreement
3 (NY)	IBEW	2000	Written Agreement

operating engineers keep up with the rapid charges taking place in the trades by working cooperatively with management and public education. They also view the college degree as a means to achieve better trained management personnel in the future.

While IUOE national feels strongly that dual-enrollment should be encouraged and promoted, for these and all of the reasons previously argued by IBEW, only a few programs actually emulate many of the elements of the Local #3 program. However, I found some very promising activities. In Maryland, as a result of the state funding structure for apprenticeship training, the community college is closely involved in apprenticeship program delivery. In Arizona and Wisconsin the community colleges recognize unique

opportunities to provide needed technical education and serve large numbers of apprentice students.

How the Programs were Developed

IBEW Local #3

The Harry Van Arsdale School of Labor Studies of Empire States College (ESC) was organized to provide a fully accredited Labor Studies college program. ESC operates on an open-learning concept -- the Local #3 program fits the model. The Labor Studies program is designed to provide structured education in the science of labor and work, and workplace relationships and organizations. Research indicates that the initial development of a working relationship with a college to develop a dual-enrollment associate degree program for IBEW Local #3 apprentices was not easy. Through perseverance and negotiation on the part of Local #3 leaders, ESC established the two-year degree program in conjunction with the newly created Labor College.

The IUOE Programs

IUOE's programs were designed and developed during the late 1970s to be implemented regionally and locally through community-technical colleges. The operating engineer trades differ depending on a localities construction procedures. Each local was encouraged to establish a dialogue with its community-technical college for dual enrollment opportunities. A national model curriculum was drafted to serve as a baseline. A national program director provides direction and advice.

Table 7-2 lists the participating college programs reviewed, including: (1) interface with the union local; (2) number of credits reported granted for on-the-job training towards an Associate Degree; (3) number of students typically enrolled; and (4) compensation given to apprenticeship training instructors.

Table 7-2

The Community College's Involvement with Dual-Enrollment Programs

College (State)	College Interface with union	Number of credits granted for appren-ticeship	Yearly Number of union sponsored students	College Paid Instructor
Fox Valley (WI)	Limited	12	900	Yes
Allegheny Co (PA)	Limited	18	<100	Yes
Central (AZ)	Yes	15	65	Yes
Catonsville (MD)	Yes	24	120	Yes
CC of RI	Limited	7	<100	Yes
Empire State (NY)	Yes	32	2000	Yes

How the Programs Operate

For dual-enrollment programs to operate successfully, there must be a mechanism for formal linkage of the various participating organizations. For the programs under study herein, that linkage initially comes via a Joint Apprenticeship Training Committee or JATC. These committees exist at both national and local levels for program operation. Often the missing ingredient on the JATC is representation of the community college.

The IBEW Program

Electrical contractors employ the apprentices to learn the skills necessary to provide electrical construction, maintenance, or repair services. These employers professionally interface through the NECA. At the national level, the IBEW and NECA jointly form the National Joint Apprenticeship and Training Committee (NJATC) for the electrical construction industry. NJATC sets uniform standards for apprenticeship training, which provide curricula and on-the-job standards. NJATC provides program operation uniformity -- and serves as a catalyst and resource for apprenticeship program operation. Local #3, NCEA and representative apprentices jointly sit on a third organization, the "Joint Industry Board of the Electrical Industry (JIB)." JIB administers the Local #3 apprenticeship program. Empire State College is represented on the JIB.

The IUOE Program

The Associated General Contractors (AGC) is the employer-contractor organization representing the construction industry. AGC contractors employ the IUOE apprentices, and as an organization participate on a JATC to ensure state-of-the art apprenticeship training. In some states (i.e. Washington and Arizona) the AGC vocally promotes the dual-enrollment concept and higher education for operating engineers. In these two states the AGC has become visible on a number of community college and state higher education boards. However, little evidence exists to document strong formal involvement of most community colleges on IUOE JATCs.

Funding

Funding for all programs reviewed was an early developmental issue. IBEW apprentices were considered by New York State as a special interest group; hence the academic program at ESC was initially barred from receiving tax dollars. Today this is alleviated by having the trade and related instruction administered by the New York City Public Schools in a city-owned and leased building. The basic funding for the program comes from the one (1) percent journeyman wage tax levied upon the employer. The average journeyman's wage is $28 hour which generates approximately $4.5 million annually for training. Note that the employer is also supporting the apprentice on the payroll as an entry-level worker during the four (4) year period (including benefits). U.S. Code (CFR 2929) stipulates that 62% of an average journeyman wage be paid to registered apprentices. This is also a cost of training.

Access to external monies. The New York State Department of Labor supports the IBEW apprenticeship program with a stipend of $1.00 per training hour per apprentice. About $13.6 Million (in 1990) was received by the New York State Education Department under the Perkins (Technology Education) Act (CFR 2929). These funds support the stipend of $1 per training hour as well as instructor costs. These monies are distributed to the New York City Board of Education for a school building for related training, two evenings per week. New York City also supplies the instructors as adjunct New York City teachers.

The IUOE's funding. Contractor's payroll tax-levy for apprenticeship training varies from IUOE local to local. In all of the reviewed cases, funding for dual enrollment programs was an issue for both unions and colleges. None of the IUOE locals support full Associate Degree costs for the apprentice. The Maryland programs offered the most assistance to dual - enrollment candidates through college tuition aid. Major issues cited by IUOE program coordinators were: (1) various state policies for state reimbursement to the college for apprenticeship college credit earned; (2) tuition aid available for apprentices; and (3) instructor salary support for apprenticeship courses.

It would appear that very ineffective communications exists in the areas of program administration between the unions and the community college. The use of Perkins vocational monies, tuition aid, and state DOL financial support needs to be strengthened to promote dual-enrollment programs. Clearly, the Local #3 program has more adequately worked out the funding mechanism. The IUOE programs have not fully benefitted from available funding opportunities in many states where the community college linkage is not in place.

The Curriculum

IBEW Local #3. Local #3's program was designed to provide college credit for the on-the-job apprenticeship training, as well as to provide the related trade theory classes held in the evening. The trade theory is taught by IBEW journeymen. The technical portion of the curriculum was adopted from the National Joint

Apprenticeship Training Council (NJATC) standards. ESC adopted their curriculum for that 30 credit portion of the program. The "Program on Non-Collegiate Sponsored Instruction (PONSI)" standards are used by ESC to equate the apprenticeship on-the-job (OJT) training and related trades classroom instruction into college level credits (30 credits) towards the AS degree. To earn the OJT credits, the apprentice must pass a competency test and complete the electrical theory courses. The competency test is modeled after the NJATC competency standards; and is both written and practical skills demonstration competencies.

ESC and Local #3 together with consultative inputs from Cornell University, Department of Labor Studies developed the labor studies portion of the program. It should be noted that through the linkage of the union, the college, and the school system, the curriculum and the instructors are monitored very closely.

The IUOE curriculum. IUOE college programs vary in the way in which they award credit for OJT (see Table 7-2). The Maryland college programs have a stipulated written agreement for 18 credits or 1/3 of the degree program. A brochure describing the process for earning credit is given to the apprentice degree candidate early into the program. Arizona also appears to have this kind of process for eleven (11) college credits; other programs use college-internal challenge for credit processes (WA); ACE/LEAP process (RI); and less formally structured processes elsewhere. IUOE local programs vary. However, in each state a coordinating body does oversee the programs, and discusses common problems and

potential solutions. Some states such as Washington and Arizona are working for more state financial support of dual - enrollment programs.

The IUOE locals use national standards to develop and implement their programs. Each local has curriculum autonomy. No college involvement was reported in the area of development of technical subjects. Likewise no union involvement with the college was reported regarding program development or monitoring of related education. Some of the IUOE program administrators did complete apprenticeship training themselves.

Whereas ESC provides broad arts and sciences courses including written and oral communications, mathematics, labor studies, history and sociology, IUOE programs vary according to the local college curriculum, but tend to emphasize technology. At this point it appears that IBEW's Local #3 emphasizes a more broad based education for its apprentice.

Instructors

There are 98 instructors and 4 general assistants in the IBEW program. New York City Schools licenses, evaluates, and trains these instructors. Instructors sit on committees and work with the Director to plan and operate the program. Together they review the curriculum annually. The director also meets nationally every three years to review the curriculum and program delivery. It is interesting to note that many union and contractor leaders are former apprentices. This lends credence to the belief that today's apprentices make tomorrow's labor leaders.

Catonsville Community College has a full - time college apprentice program coordinator to interface with all unions in program delivery. Catonsville services IBEW, IUOE, and other union programs in an off-site faculty dedicated to these kinds of programs. Other colleges such as Fox Valley Technical College support the development of apprenticeship instructors through instructor training at universities such as at the University of Wisconsin at Stout. The ultimate success of a dual-enrollment program is with its instructors -- therefore use of any and all appropriate resources for instructor training is essential.

Program Length

Local #3 runs a 4-year, state-registered program, whereas IUOE programs are 3 years in length. After the 4th year, IBEW apprentices are no longer registered with the state, but they are under the obligation/jurisdiction of the union for another 18 months until they become full journeymen (5 1/2 years).

All apprentices must work a minimum of 35 hours per week under a journeyman electrician. If construction is slow and there is no work for apprentices for a period of time, apprentices must work about 80% of that year to advance. Students in both of these programs must attend on their own time and they are not paid to attend.

Other Assistance from Unions and Contractors

Recruitment/Follow-up

Horstrup and Kracht (1980) argue that dual enrollment of apprentices promotes enrollments. Table 3 presents the overall

enrollments reported by the colleges, as well as the resources and degrees of involvements with the unions. In many cases college officials do acknowledge the enrollment potentials of union sponsored students. Recruitment occurs usually once per year for IBEW apprentices. Local #3 receives abut 2,000 -4,000 requests per year. Applicants are given aptitude tests administered by the union. Transcripts are also reviewed. About 700 apprentices are selected each year. There are 2 classes each year -- in 6 month intervals. All apprentices are members of Local #3 and are employed by contractors that have an agreement within the joint industry board. The apprentices are registered with the State DOL.

IUOE apprentices are recruited by the locals, usually through newspaper, local Departments of Labor, and/or word-of-mouth. Little community college involvement in recruiting was reported by either program.

A follow-up of apprentices in the IBEW program reveals many success stories including apprentices earning positions of leadership in the local and national levels; some becoming entrepreneurs; bachelor degree completers, etc. All of these are evidence of a successful program.

Summary

Labor-contractor sponsored cooperative apprenticeship is proven to be more than a training tool or system. It is a potential mechanism for bringing together, in a planned and cohesive manner, the human and capital resources, within a community (business, civic and political), to solve an organized

labor human resource education and training need. As an added benefit, it acts as a catalyst to improve a union's strength and posture and to foster partnerships for training and economic development (see Figure 7-1).

Insert Figure 7-1 about here

Collaboration is the key to successful apprenticeship program development. Why then, do labor organizations, employers and colleges collaborate? Findings indicate that collaboration occurs when: (1) all are able to derive mutual exchanges from each other (i.e quid pro quo); (2) all are able to access external monies collectively which they otherwise could not obtain; (3) all have conflicting goals, and such collaboration allows for a mediation of these conflicts in a socially approved manners; and/or (4) all formally agree, vis-a-vis a contract stipulating specific roles and responsibilities to collaborate.

One IUOE union apprenticeship coordinator related that "... a decade ago it was hard to find a machinist with a knowledge of numerical control machines (or sic) an electrician with a knowledge of microprocessor or fiber optics..."[8] As a result of partnerships with community colleges, apprentices now are afforded these kinds of skills and knowledge which are highly desired by the employer.

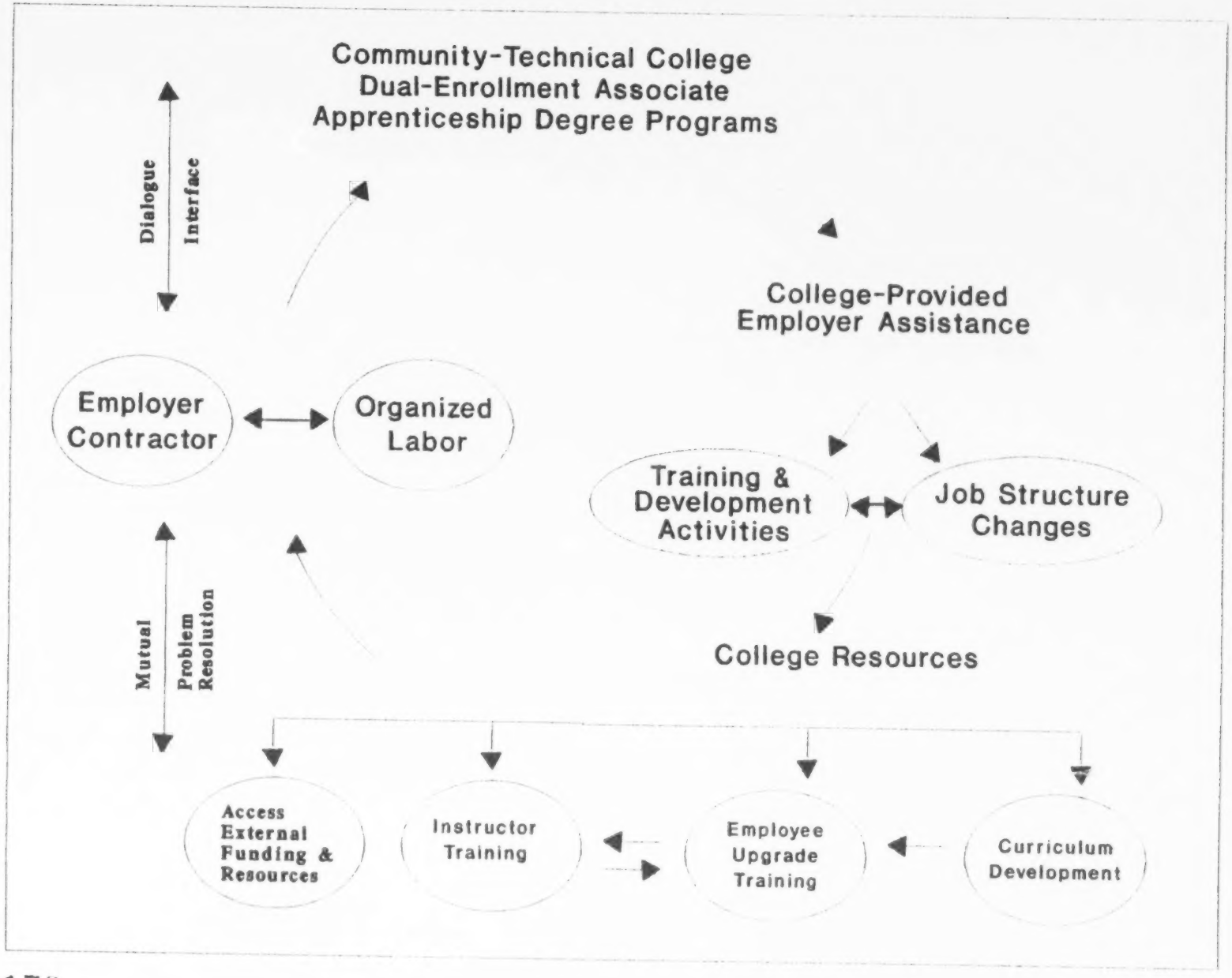
Training programs require significant costs in times of tight budgets. Often paybacks are long in coming and not readily

measurable by an employer. The funding of a training program is no simple matter. Unions, employers, and in some cases industry groups use Joint Apprenticeship Trust Funds to mutually support apprentice training. The Training Trust Fund concept continues to be used as a mechanism for jointly funding apprenticeship programs and projects and should compliment dual-enrollments with the community college. Unions have successfully accessed external monies as a result of partnerships with higher education.

Apprenticeship has traditionally provided a mechanism for organized labor and employers-contractors to jointly control and monitor employee training and development. In recent years it also has provided a way to control to some degree technological changes in the workplace through a phase-in process with employee retirement and replacement. As a training ground for tomorrow's union leaders and business people, apprentice participation on these committees gives the potential leader experience in mediation and problem-solution formulation.

Figure Caption

Figure 7-1. A model for organized labor - community college dual - enrollment linkages.


Community-Technical College
Dual-Enrollment Associate
Apprenticeship Degree Programs
Dialogue
Interface
College-Provided
Employer Assistance
Employer
Contractor
Organized
Labor
Training &
Development
Activities
Job Structure
Changes
Mutual
Problem
Resolution
College Resources
Access
External
Funding &
Resources
Instructor
Training
Employee
Upgrade
Training
Curriculum
Development

Endnotes

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8. Tuholski, R.J. (1982, October), ibid.

Chapter 8

Apprenticeships, the U.S. Maritime Industry and the Community College: Linkages in America's Defense

A concern of the American maritime shipbuilding and repair industry is to identify more effective and appropriate means for attracting and training and educating their technical workforce approaching the 21st Century. This concern is underscored by changing demographics, fewer available workers, and an all too severe literacy problem among American shipyard workers.[1] At the same time increasing maritime technological requirements are mandating an equivalent of two years of post-high school education and training for the majority of works. An increasingly used training process is the apprenticeship -- cooperatively sponsored by employers (and sometimes organized labor representing both government and private yards), and the community college -- providing access, through dual-enrollments with post-secondary degree-earning technical education. These cooperative ventures promote local economic development initiatives by recruiting and preparing workers for existing jobs. This study looked at initiatives in the maritime industry to see what works, and why, and to propose methods and processes to foster better working relationships between the maritime industry and the community college in America's defense.

A Changing Maritime Defense Industry

Workforce 2000 research conducted by the U.S. Navy's Office of Civilian Personnel Management indicate that there will be a serious shortage of skilled workers in the American defense workforce over

the next 12 years.[2] Findings reiterated that significant changes are projected in the characteristics of the potential labor pool available to the Navy, including increases in the average age of the workforce; in the proportion of recent immigrant in the labor pool; and in increases in the number of women and minorities coming into the workforce. Pessimism also exists about the ability of our education system to provide these workforce entrants with adequate mathematics and English language skills to support shipyard technical work. Apprenticeship is desirable given the difficulty of recruiting, training and often remediating a workforce according to DoD, OPM and GAO findings and the Workforce 2000 report. All of these issues underscore the need for community college linkages to assist and support maritime worker training and education. To best understand what both the Federal and private sector yards are presently doing in apprenticeship training, and how more effective apprenticeship-community college dual-enrollment linkages can happen, this portion of the study was undertaken.

Apprentices on Campus

Dual enrollment of maritime apprentices in community colleges is not new. What is new is a move towards an apprentice earning Associate Degree credit. This chapter looks at programs sponsored by: (1) The United States Navy in its shipyards; (2) other Federal maritime agencies; and (3) private sector shipbuilding and drydock firms. In these several cases either college level credit or full associate degree programs were initiated by the employers in

cooperation with the community colleges to best meet current and future needs for well trained and educated workers.

The Maritime Apprentice

As a form of structured training, the maritime apprenticeship dates back to U.S. colonial days. U.S. Navy apprenticeship training is perhaps the oldest continually operating program in the United States. Apprenticeship has a long tradition in U.S. Navy civilian workforce training. The Navy's first "apprentice boy" was hired in the Washington Navy Yard in 1810. The first formal U.S. Navy apprentice school opened at Mare Island Navy Yard in 1858, under the administration of David Farragut. Yet, it remains one of the most vital forms of training for today's civilian defense worker, especially in high-technology areas. Today all eight Naval shipyards (Portsmouth, N.H., Philadelphia, Pa., Norfolk, Va., Charleston, Sc., Long Beach, Ca., Mare Island, Ca., Puget Sound, Wa., and Pearl Harbor, Ha.) operate some form of apprentice training. Other Navy activities including Naval Air rework facilities also use apprenticeship.

Not to be overlooked are some very longstanding and prestigious apprenticeship training programs operating at private sector yards, such as: (1) Newport News Shipbuilding and Drydock Company; (2) Norfolk Shipbuilding and Drydock; (3) NASSCO, San Diego; (4) Ingalls; (5) Bath Iron Works; and (6) Avondale Shipyards.

Apprenticeship training offers promise in meeting some of the challenges facing the maritime industry over the next decade.

How the Programs Operate

The U.S. Navy's eight shipyards (NSYs) each operate an apprenticeship training program for their new technical workers. These programs provide training in approximately 43 different trade areas, depending on the shipyard's needs. NSY apprenticeship program sizes vary from 38 trainees at Long Beach NSY to 661 at Norfolk NSY. In total there are 2,651 apprentices across the eight yards; representing approximately 10% of the total NSY worker population -- a goal that the U.S. Navy strives to maintain in order to ensure a continual supply of trained manpower. Private sector yards exceed these numbers significantly. Apprentice-trained journeymen are a majority of each of the shipyard workforces.

However, the apprenticeship programs are important to these shipyards not only as a source of skilled workmen but also because apprentice-trained journeymen provide the pool from which supervisors and managers are drawn. Some 87% of the Naval shipyard superintendents (heads of the major shop and trade groups) are former apprentices. This system of internal advancement provides shipyards with dedicated upper-level management skilled in the "nuts and bolts" of ship construction and repair. It sets Naval shipyards apart from most industrial organizations which tend to employ managers without the same "hands-on" experience or pride of

product. Herein lies the principal reason for sponsoring higher educational opportunities for these workers, through coordination with local community colleges.

The NSY Apprenticeship Program

For some years naval shipyards have been almost completely in the repair as opposed to the ship building business. Despite recent modernization and automation in the industry, effective and safe ship repairs remain dependent upon the knowledge and abilities of large numbers of highly skilled craftspeople. There are no assembly lines in ship repair. Craftspeople work independently at non-repetitive tasks and must apply analytical abilities and initiative, as well as judgement to accomplish their work. Good reading skills are required for interpretation of job orders, technical manuals, and specifications; mathematics supports a variety of work-related calculations.

The apprenticeship training in all trades is designed in a 4 year program. However, recent dialogue among the yards, Naval Sea Systems Command, and the Navy's Office of Personnel Management indicates a desire to shorten this to 3 years for some trades where appropriate, to reduce costs and facilitate worker entry into journeyman ranks. Private sector yards' programs vary in length -- from two to four years.

Each of the eight Naval shipyards is unique in its organizational configuration; the availability of geographically local educational services; worker population characteristics; and

potential pools of labor. Many of these variations apply to private yards as well. Apprenticeship training program design is modified locally in order to ensure that each program meets the local shipyard's needs and requirements. Figure 8-1 displays Pearl Harbor's program design. Each of the yards' personnel department apprentice training coordinators matches their apprentice-related training requirements to the local community college program offerings. Hands-on training and related classroom instruction takes place in the shipyard. College instructors will work, on-site, in the yard. Some of the programs do use college facilities for portions of the shop instruction, or for additional classroom space.

Insert Figure 8-1 about here

Dual-enrollment variations. Fully realizing that the next generation of shipyard management will come from apprentice ranks, encouragement is given to the apprentice to complete an Associate Degree in conjunction with the apprentice training. The Navy firmly believes that NSY trades workers should earn a college degree. Each of the NSYs has worked with their local colleges to make this as feasible as possible for the apprentice. Several different program designs have been put into practice. These include: (1) college level credit granted for apprenticeship hands-on work, and for classroom trades theory work; such as exists

at NSY Long Beach and Norfolk; (2) cooperative education apprenticeships with a community college, as done at NSY Norfolk, Charleston, and Pearl Harbor; and (3) pre-apprenticeship programs such as at Norfolk and Charleston NSYs.

Most of the NSYs now "front-load" their regular apprentice programs, whereby the community college provides the apprentice with the required related trade and general education and training during the first year of the apprenticeship. Those trainees not academically prepared to handle this work would be identified early on, and terminated from the program, or provided remediation.

Cooperative education programs are gaining popularity among the NSYs. In operation, the college and the NSY work together to recruit trainees from high schools and/or the general college community. The trainees initially attend the college's existing technical education programs for the first two semesters, at their own expense. The student serves as an apprentice during the summers in the NSY. Once evaluated by the NSY and accepted into the apprentice program, and upon completion of the first year of college, the student becomes an apprentice. The second year of college is then attended part-time, and paid for by NSY. In the Trident College coop program, student degree completers enter into the third year of the Charleston NSY apprenticeship. In many instances the enrollment of these workers into the college provides for a major portion of the college's enrollment (FTE).

Table 8-1 summarizes the NSY programs. In most cases the NSYs have contractual relationships with a local community college to provide the related trades theory, general education both written and verbal including communications skills, and math and science necessary to carry out their duties.

Insert Table 8-1 about here

The college role. College participation varies from program to program (Table 8-2). Trident Technical College in Charleston, is a leader in cooperative education. The NSY and other Navy programs constitute a large population of students for the college -- half of all cooperative education students are Navy workers at Trident. Trident is motivated by a full time student equivalent enrollment (FTE) of 120 FTE a year.

Insert Table 8-2 about here

Trident recognizes the value of the hands-on activity portion of the apprenticeship and grants credit for apprenticeship. An Associate in Technology degree is offered for apprentices. Trident participates actively with the NSY employer, and has a full-time coordinator and a Shipyard Advisory Committee which provides guidance to the program. The program was initially developed under a Federal Title VIII Cooperative Education grant.

Tidewater Community College in Norfolk, VA is another leader in apprenticeship program support. Tidewater generates about 250 FTE a year from these programs, and is currently developing an umbrella AS program similar to the Trident Associate in Technology degree. TCC provides several methods of instructional delivery for the NSYs, including: (1) pre-apprenticeship; (2) cooperative education; and (3) on-site related trades instruction. The on-site program equates to 43 college credits and an Engineering Technology Certificate. The additional courses requisite to an AS are offered at the NSY and at the private sector firms in the area such as NORSHIPCO - as after-hours courses.

Other Federal Apprenticeship Programs

U.S. Navy-NAVAIR rework facilities. NAVAIR operates a 4-year apprenticeship program in several trade areas in cooperation with Tidewater Community College. This program works as a cooperative education apprenticeship. Students accepted into the cooperative program complete the first year as a full-time engineering student at the college. Summer is spent at a Navy facility working as an apprentice. The student is evaluated during the first year. Upon satisfactory completion of the first year of the program, and acceptance into the yard, the student becomes an apprentice and works under the supervision of a master technician for three more years. College work then continues on a part-time basis.

Curtis Bay Coast Guard facility. A 4-year apprenticeship program is sponsored by Curtis Bay. Anne Arundel Community College

provides on-site related instruction to accompany this program. Some of the related instruction can be applied towards college credit. Curtis Bay is working on a cooperative education program involving their local vocational-technical high schools together with Anne Arundel Community College.

Commercial Maritime Industry Apprenticeships

Not unlike their Federal counterparts, private sector yards conduct similar programs using community colleges to provide both related trades instruction and college degree credit. In many instances the enrollment of these workers into the colleges provides for a major portion of the local college's enrollment statistics (FTE). Each of the firms reviewed conduct apprenticeship programs and offer trainees opportunities to earn college level credit. Table 8-3 presents the private sector programs reviewed.

Norfolk Shipbuilding's apprenticeship program is 3 years in length, and offered in seventeen different trade areas. Like each of the other three programs discussed herein, Norfolk Shipbuilding pays the full cost of an apprentice's training. Tidewater Community College (TCC) provides the related trades instruction -- on-site at the shipyard -- and compliments the program with general education necessary for successful job performance in the chosen trade. Many of the firm's top management have come from apprentice ranks. TCC awards an Engineering Technology Certificate for

Table 8-3

Private Sector Programs

Ship Yard	# of trades	Partic. C.C.	# of Appren.	Deg/Cert	Credits Awarded	External Funds
Ingalls	13	Jackson Co. CC	1,000	B.S.	45	Perkins/ JTPA
Avondale	2	Delgato CC	60	-	15	Perkins/ JTPA
Norfolk Shipbldg	17	Tidewater CC	---	Engin. Tech Cert.	45	Full Paid
Newport News Shipbldg	20	Thomas Nelson CC	712	Engin. Tech AS	30	Full Paid
NASSCO	1	San Diego CC	10	Machine Shop Cert.	24	Full Paid
Bath	5	Maine Maritime Academy	200	Associate in Ship Design	60	Full Paid

program completion; and an associate degree upon completion of several additional general education courses.

A well recognized pre-apprenticeship program providing entre into Norfolk Shipbuilding's program is conducted by the Tidewater Maritime Trades Foundation called the Tidewater Maritime Training Institute (TMTI) a non-profit educational foundation (IRS Code 501c3) whose members are the area shipyards.[3] TMTI has been in operation since 1982, and has successfully provided pre-apprenticeship training for almost two dozen Tidewater area

shipbuilding firms. The foundation is also a medium for collective business development for the area shipyards. TMTI trainees are taken into the Norfolk Shipbuilding apprenticeship program with credit for 18 months of the 3 year program.

The Newport News Shipbuilding and Drydock Company operates a prestigious 4 year apprenticeship program in 20 trade areas. Thomas Nelson Community College provides on-site related trades theory classes, advanced technical training, and general education courses to compliment the program. All costs, included college-related course costs, are borne by the firm for the apprenticeship training; additional college general education costs are reimbursed by the firm upon successful completion of the college work towards an Associate Degree. College work follows the apprenticeship training, after hours at the firm. Of noteworthiness, the apprenticeship itself is creditable towards a degree. Apprentice program completers will receive a TNCC Engineering Technology Certificate; upon completion of the additional college courses, the student can earn an Associate in Science degree in a technology area. About 20% of the apprentices complete the college degree.

The Bath Iron Works program is somewhat different in method of delivery. Its close liaison with the Maine Maritime Academy (MMA) provides an opportunity for a Bath apprentice in any of five different marine design areas to earn an Associate Degree after completion of 8,000 hours of instruction; and as part of the apprenticeship work with the company. Trade and related education

instructors are Maine Maritime Academy faculty who work on-site at Bath Iron Works. The MMA and Bath Iron Works developed the program together and jointly operate it. Program options include electrical, HVAC, hull, piping, and structural specializations. About 15 credits of the college curriculum are awarded for the technical "hands-on" portion of the apprenticeship.

NASSCO's 4-year apprenticeship program is supported by San Diego Community College. NASSCO's apprentices attend college related-instruction courses together with apprentices from a number of other firms in the area. Courses are taught on NASSCO's site, or at other area firms. They earn 3 units of college credit per semester, over 8 semesters -- attending classes 2 nights a week after work hours. However, to complete an associate degree they must complete additional arts and sciences courses on their own, after the apprenticeship period is completed.

Ingalls Shipyards, Pasgagula, Mississippi has operated an apprenticeship program in 13 trades since the 1950s. For the last five years it has cooperated with Jackson County College. Their programs are traditional 4-year apprenticeships with the exception of welding which is a 2-year long program. The community college awards credit for the full program --however the apprentice must complete 15 credits of general education independently of the firm's program, in order to complete the Associate Degree. Ingalls reports that about 30% of the apprentices complete the degree. State Perkins funding is accessed via the community college to pay

for the instructors, facilities and equipment to operate the program.

Avondale Shipyards operates a small apprenticeship program with the support of Delgato Junior College. Again state vocational monies fund the salaries of instructors. In some instances Job Training Partnership Act funds have also been used.

Finances. Many of the private sector yards use Perkins vocational and Job Training Partnership Act monies to fund instructors and instructional equipment. However, more dialogue is needed between shipyard apprenticeship coordinators and community college personnel to explore these funding opportunities, especially government yards. These revenue sources make it more desirable for the maritime industry and the community college to cooperate for apprenticeship training. For instance, under the Comprehensive Employment and Training Act of 1973, an estimated 265,000 apprentices received training, costing 185 million dollars from 1963-1976.

Other Cooperative Assistance

Student Personnel & Recruitment

Community college assistance in recruiting students for cooperative apprenticeships in the NSYs is readily provided by all colleges operating cooperative programs. Trident Tech and Tidewater Community College report excellent results in such efforts. Most of the colleges also provide remedial and basic academic skills learning opportunities at the NSY for apprentices.

Accessing External Funds

Training programs require significant costs which are often not readily available in times of tight budgets. Often training paybacks are long in coming and not easily measurable by an employer. Identification and use of training program funding is not a simple matter. New legislation such as the Perkins Technology Education Act Amendments of 1990, and the Community-Technical College Act do provide funding opportunities for apprenticeships. Maritime employers have successfully accessed these kinds of external monies as a result of partnerships with community colleges. The training trust fund concept also continues to be used as a mechanism for jointly funding apprenticeship programs and projects and should compliment dual-enrollments with the community college. Employers sometimes use joint apprenticeship trust funds to support apprentice training.

Finances. NSY apprenticeship training costs are borne by the government. Award of college credit for apprenticeship training, and/or the related trades theory classroom work offered by the college varies from NSY to NSY; and the college costs also varies among the states in which the NSY and college are located. All of the colleges report counseling students about PELL, GSL, and other sources of funds for any portion of the training program that they must personally pay. In California, the program is essentially underwritten by the state as a result of its very low tuition status. Programs operating in Maryland are co-sponsored by the

state division of continuing education under Perkins and other federal monies. For instance Avondale Shipyard uses JTPA and Perkins funding. Private sector programs sponsored by unions are also eligible for joint training trust fund monies.

Formal Contracts

The U.S. Navy has by far, the most formal arrangements of the programs reviewed. It serves as a model for other programs. The Federal government usually uses the competitive bidding process to secure these services. Programs also have forms of written agreements for credit award, for faculty use, instructor compensation, etc. Formal agreements are important for program continuity and for mutual understanding of roles and responsibilities. They provide for clear communications to institutionalize cooperative programs.

Other Support (i.e. facilities - technical assistance)

The NSY provides on-site classroom space for the college at all of the yards. In turn the colleges make lab space available for specialized instruction. Private yards such as Newport News also allow the college to use company classrooms for other instruction in addition to apprenticeship related instruction. Such arrangements become mutually profitable.

How Programs are Developed

Collaboration is the key to successful apprenticeship program dual-enrollment operation. Why then, do employers and colleges collaborate? Findings indicate that collaboration occurs when: (1)

all parties concerned are able to derive mutual exchanges from each other (i.e quid pro quo); (2) all parties can and are able to access external funding collectively which they otherwise could not obtain; (3) the parties have conflicting goals, and collaboration allows for a mediation of these conflicts in a socially approved manner; and/or (4) all parties formally agree, vis-a-vis a contract stipulating specific roles and responsibilities to collaborate.

Partnerships Derive Mutual Exchanges

The maritime industry collaborate with the community college to reap mutual benefits which alone could not be assessed. The Navy shipyards benefitted from the community colleges' remedial education capabilities; and in many cases from the administrative on-site support provided by the college. Course and curriculum design and development, and instructional technology was also a benefit. Shipyards also benefitted from community college collaboration through outreach and recruitment of new trainees -- especially minorities and women. Such recruitment was not always successful when done directly by the employer. The college in turn benefits from the large numbers of dual-enrolled apprentices. These additional FTE -- off-campus -- provides very desirable revenues from the college sponsors (state or county), without space constraints on the college. They are also able to better meet their community commitments and institutional goals.

Of paramount concern is the shipyard's ability to identify and train instructors via the community college. They also collaborate

to allow their trainees and other employees to master new technology; and also earn academic college credit for the training programs, often taught by their own master-craftsmen. One apprenticeship coordinator related that "... a decade ago it was hard to find a machinist with a knowledge of numerical control machines (or sic) an electrician with a knowledge of microprocessor or fiber optics..." As a result of partnerships with community colleges, apprentices now are afforded these kinds of skills and knowledge which are highly desired by the maritime employer. College faculty in turn benefit from the association with shipyard craftsmen, enabling them to maintain and/or develop state-of-the-art skills.

Partnerships Can Mediate Conflicts

Apprenticeship has traditionally provided a mechanism for organized labor and employers-contractors to jointly control and monitor employee training and development. In recent years it also has provided a way to control to some degree technological changes in the workplace through a phase-in process with employee retirement and replacement. The apprenticeship serves as a mechanism for using the community college as a training resource, economic development catalyst, and source of technical advise and consultation. However, to do so, partners must alleviate barriers through communication. The use of the program coordinating and advisory committee as Tidewater and Trident Community Colleges do; and the operation of a joint industry board as demonstrated by

NASSCO and San Diego Community College have proved successful in this regard. The Maryland community colleges also cite examples of technology upgrade training via dual-enrollment apprenticeships. As a training ground for tomorrow's leaders and business people, apprentice participation on these committees also allows the potential leader experience in mediation and problem-solution formulation.

A Philosophical Commitment

A firm belief in the value of higher and continuing education must be evident to all concerned in a community college apprenticeship program. Maritime industry officials all believe in college level technical education as a basic necessity to today's and tomorrow's workers. Without such a belief the program will not develop or last. Additionally, the term "quid pro quo" takes on new meaning in the development of these programs. Unless there is a clear benefit to all parties concerned such cooperative relationships do not work or last. Likewise clear means and methods for communication must be institutionalized.

The participation of a non-profit educational foundation also serves as a catalyst for exchange of ideas and resources as administrated by the TMTI in Norfolk. The shipyards were able to share business development ideas and resources; lobby for policy changes; pursue international business opportunities; and train entry-level workers -- collectively.

In Closing

Clearly, over the next eight years we will see some revolutionary changes in our system of education in the United States. Government, as well as business and industry will take on a predominant role in the development of policy, and perhaps in the operation of educational programs. Apprenticeship as a form of structured workplace learning will become, once again, an accepted practice -- but this time in cooperation with higher education.

Figure Caption

Figure 8-1. A model for NSY - Community College Apprenticeship.

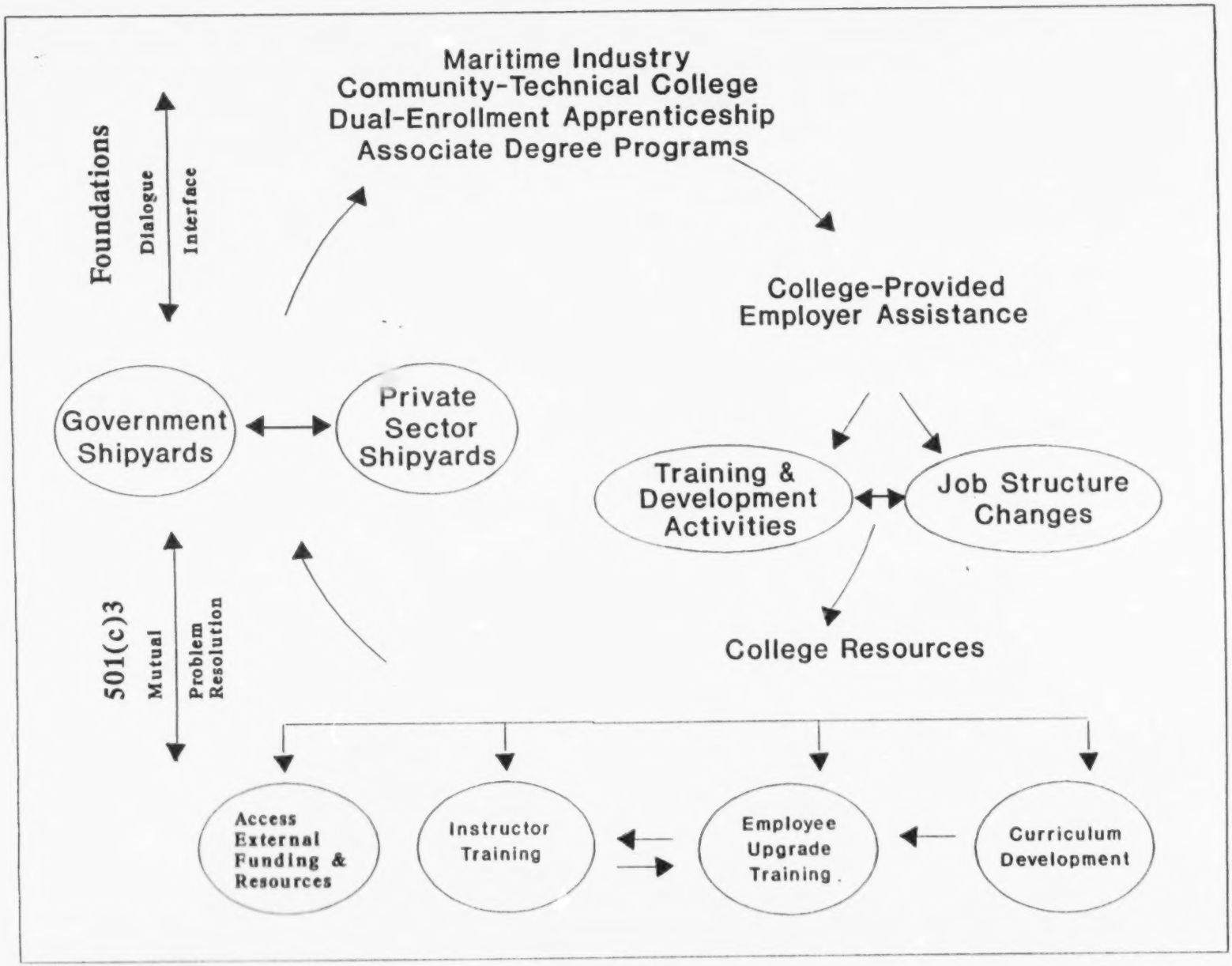
Maritime Industry
Community-Technical College
Dual-Enrollment Apprenticeship
Associate Degree Programs
Foundations
Dialogue
Interface
College-Provided
Employer Assistance
Government
Shipyards
Private
Sector
Shipyards
Training &
Development
Activities
Job Structure
Changes
501(c)3
Mutual
Problem
Resolution
College Resources
Access
External
Funding &
Resources
Instructor
Training
Employee
Upgrade
Training
Curriculum
Development

Table Caption

Table 8-1. NSY Apprenticeship Programs

Table 8-1

NSY Apprenticeship Programs

Naval Shipyards	Active Appren Pgm/ # trades	Partic. C.C.	Coop. Pgm Option Avail.	Current # of Apprent.	% dn from 1985	Cost per Apprent.	Credit for OJT
Pearl *1	Yes/7	Honolulu C.C.	Yes	180	10	-	No
Mare Island *2	Yes/28	Solerno College	No	421	55	None/free	No
Puget Sound *3	Yes/41	Olympic College	No	550	28	100,000	Yes
Long Beach *4	Yes/4	Long Beach City College	No	38	80	None	Yes 8 Theory 4/sem/OJT
Philadelphia *5	Yes/32	Spring-gardan Univ	Yes	371	65	1,000	Yes 12
Charleston *6	Yes/20	Tridant	Yes (40 are Coop)	180	60	3,000	40-50qh
Portsmouth *7	Yes/30	Hesser College	No	250	50	-	Yes
Norfolk *8	Yes/10	Tidewater	Yes	661	50	$572 21.5 cr	Yes

Notes

1. NSY Pearl working on a coop program which will provide 50% of its opportunities in future. Currently there are 80 coop students who work 3 summers in yard while attending college. Coop students upon satisf. graduated with degree; then enter the NSY apprenticeship program without any entrance exam.

2. NSY Puget uses a 3 week on-the-job followed by 1 week in classroom model. Additional humanities credits offered after hours via Olympic College will qualify apprentice for the Associate in Technical Arts degree. Note that 30% of these entrants come in with an AS degree and another 10% have a Bachelors degree.

3. NSY Mare is currently working with the Solerno County business community and the Vallejo Unified School District toward starting a coop program in the summer of 1993. They had one in the 1970s. Solerno has a coordinator and administrative support at NSY.

4. NSY LB currently has its program on hold. Yard is downsizing.

5. NSY Philadelphia - Program closing down as yard is scheduled to close. Springgarden College awards 12 credits for work in yard. Coop program is under development which will provide 1-2 years towards apprenticeship.

6. For coop students AS from Tridant coop program, enter into 3 year apprenticeship at NSY. NSY Charleston is employing coop as a means of entry. Student pays for coop program.

7. NSY Portsmouth is currently in bid process for new college support. Articulation agreement with NNVTC provides for college credit for apprenticeship work. 1,600 workers out of current 8,000 in yard were apprentices.

8. NSY Norfolk. Pre-apprenticeship program is operating also Jr/Sr High School students work summers, then go to TCC for 2 semesters, then go to work in yard. Their 3th and 4th semester at TCC is then paid for by NSY. In regular apprenticeship program, academics are front-loaded to maximize best apprentices going on. 18% of entrants already have an AS degree.

Table Caption

Table 8.2 Community College Involvement

Table 8-2

Community College Involvement

Community College	Coop Arrange With	Specialized Certif. or Degree	Shipyard On-Site Coord.	Number of Instructors	FTE/Yr	Coop Pgm	Recruit & Counsel Assistance	Remedial work Provided	Financial Assistance
Tidewater C.C.	NSY-Norfolk NAVAIR Norfolk Shipbldg	Engineering Technology Certif (Deg. in progress)	Yes	8	250	Yes	Yes	Yes	Yes
Thomas Nelson C.C.	Newport News Shipbldg NAVAIR	Engineering Technology Certificate	Yes			Yes	Yes	Yes	Yes
Maine Maritime Academy	Bath Iron Works	Associate in Ship Design	Yes	12			Yes	Yes	N/A
San Diego C.C.	NASSCO	No	No			No	Yes	Yes	Yes
Ann Arundel C.C.	Curtis Bay C.G.	No	No			In work		Yes	Yes
Jackson Co. C.C.	Ingalls Shipyd								
Trident Tec C.C.	Charleston NSY other naval facilities	Associate in Technology	Yes		120	Yes	Yes	Yes	Yes
Honolulu C.C.	Pearl Harbor NSY	Associate in Applied Arts	Yes			Yes	Yes	Yes	N/A
Olympic C.C.	Puget Sound NSY	Associate in Technical Arts	Yes	8	153	No	Yes	NSY Provided	N/A
Solerno C.C.	Mare Island NSY	Associate in Shipbldg	Yes	3		No	Yes	Yes	N/A

Endnotes

1. While white males have been the most employable segment of the U.S. maritime shipbuilding population, they are becoming scarce. The industry expects to see an influx of immigrants to the industry by the turn of the Century. It is expected that most of these will be females, Hispanics, and Asians. (Also see Johnston, W.B, & Packer, A.E. {1987, June}. Workforce 2000: Work and workers for the twenty-first century. Indianapolis, IN: Hudson Institute, 97).

2. The Department of the Navy. (1990, January). Apprentice program task force report. Washington, DC: Office of Civilian Personnel Management.

3. Cantor, J.A. (1986, June). The job training act and shipbuilding: A model partnership. Personnel Journal, 118-125.

Chapter 9

Firefighter Training 2000:

Apprenticeships and the Fire Service

Firefighter training continues to attract attention from the professional firefighter leadership as well as from political, civic, and educational communities. Why? Firefighter performance affects everyone -- in terms of lives and property saved. Fire departments are also faced with:

- o more non-traditional groups seeking to joining the ranks of the fire service;
- o basic literacy skills deficiencies among many recruits which increase training costs; and
- o legislation (i.e., Affirmative Action, EEO) which also impacts training costs.

The answer to some of these problems and the best and most cost-effective way to ensure optimum performance from the firefighter is through work-based training.

A Need for Cost-Effective Training

Firefighter basic training is very important. Yet, it is also very expensive. Many recruits do not complete basic training -- either due to the physical or intellectual demands of training. To solve this problem fire departments are joining with their local community college to provide the best overall and most cost-effective training that they can provide. An age-old training process is now being rediscovered by many fire departments and community colleges -- the apprenticeship.

Structured Cooperative Workplace Training

Apprenticeship is proven an effective method for skills acquisition in the fire service. Today fire service apprenticeship includes cooperative work-based training, a standardized, on-the-job training coupled with specific related technical instruction for a specified time period by master firefighters. The fire service, together with state and Federal governments recognizes apprenticeship's importance to maintain adequate supplies of skilled workers for community safety and economic growth. In fact, apprenticeship as a method of instruction is included in the California Fire Service Instructor curriculum. The apprentice is compensated for the work performed during the training period, with a written agreement spelling out rates of compensation, working conditions, skills to be learned, and length of training period.

Why Cooperative Apprenticeship in the Fire Service?

The demands of modern fire protection and suppression require even greater knowledge and skills on the part of today's firefighter. Cooperative apprenticeships provide for a systematically planned training program which increases worker productivity, and provides the versatility necessary to meet constantly changing conditions. Apprentice training programs can be conducted by a single fire department, a group of departments, or by a joint apprenticeship committee (JAC) representing various fire departments, a state labor department, and organized labor. Thus it enables departments of all sizes to meet present and future skilled worker needs. It enables a department to predict when

journeymen will be needed on the line, and design training to have workers ready when needed.

Apprenticeship enables fire departments to share training resources. It offsets the costs to the fire department of the training without changes in staffing, resource allocations, or company manning. In fact, boots go on-line earlier, and learn departmental-specific techniques and procedures. In many instances fire departments already work cooperatively at various community levels (i.e., mutual aid) to provide their services.

As late as 1989, the U.S. Department of Labor's, Employment and Training Administration advocated expanding the cooperative apprenticeship training concept. These following aspects are workable in the fire service:

- o combining classroom and theoretical instruction with structured on-the-job training.
- o formal recognition (i.e. accreditation) of the programs, and awarding of worker credentials upon completion.
- o private sponsorship, tailored to the workplace, with limited support from government and education;
- o the transfer of skills on-the-job through a mentor or skilled supervisor;
- o the opportunity for the worker to acquire skills while earning a wage;
- o a contract or agreement between the training sponsor

(employer) and the trainee on the process and outcomes of training;

- o skills development through competency-based learning;
- o specific recognition of skill attainment; and
- o attention to basic workplace literacy issues and attainment of advanced technologies needed to upgrade existing skills.

. How the Programs Operate: One State's Perspective

Cooperative apprenticeship takes many forms. I surveyed fire departments at community colleges throughout California. By-and-large the most prominent apprenticeship program model used throughout the state was the California Firefighter Joint Apprenticeship Program (CALJAC). However, some colleges and fire departments use other cooperative methods such as reserve or volunteer firefighter training experiences.

Note that while some fire departments did not participate in CALJAC or other forms of cooperative apprenticeship, many of the cooperative training components were evident, making apprenticeship easy to implement by these departments. As an introduction, I will first describe CALJAC, which has similar counterparts in other states.

<u>The California Fire Fighter Joint Apprenticeship Committee</u>

The California Fire Fighter Joint Apprenticeship Committee (CALJAC) is a non-profit organization which has as its goal to improve the quality of training for California firefighters, and to provide an avenue of entre into the fire service for qualified,

under-represented and targeted groups within the workforce. As most apprenticeship programs in the California fire services are undertaken jointly by management and labor, responsibilities for the program are shared by the California State Fire Marshall (CFM) {representing management} and the California Professional Firefighters {representing labor}. Some of the programs reviewed were:

o The Modesto City Fire Department (MCFD) which currently has a contractual relationship with Modesto Junior College (MJC) for its basic training academy. MCFD has 27 apprentices registered with CALJAC and also attending the academy. MCFD believes that the best way to conduct basic training is through apprenticeship with trainees dual-enrolled in a community college-operated fire academy.

o The Santa Ana Fire Department (SAFD) uses apprenticeship for both reserve and firefighter basic training. SAFD uses the CALJAC program for firefighter journey-level training; and soon will use it for the reserve program. Fire Dispatcher and Fire Prevention Officer are other job titles which will soon become CALJAC-participating by SAFD. In total 205 trainees are currently CALJAC Apprenticeship registered in this department.

o Sacramento Fire Department (SFD) operates training programs through a consortia agreement, which includes several fire departments and the Sacramento County Community College District. An advisory committee consisting of members of each of these parties meets monthly and governs the program's operation. State

Perkins Vocational Education funding supports the program's operations. Money flows through the community college to the fire agency. The regional fire academy is staffed by fire department personnel, who are assigned to various courses by the advisory board. The 480 hour basic training academy is developed to the same California State Fire Marshals' standards used for apprenticeship program operations -- the basic requirements for Firefighter I Certification. Three community colleges participate in this consortium. The basic academy is paid for by the sponsoring agency; advanced work is paid for by the firefighter, although the community college provides financial aid and assistance as necessary.

CALJAC Program Operation

CALJAC offers some very desirable benefits, in addition to the financial incentives, to the fire department and community college. CALJAC training program standards ensures quality control of the overall training program, as basic standards are specified, monitored, and adhered to by all parties. MCFD and SAFD both cited these as a reason for participating. The training for CALJAC apprenticeable occupations is based on California as well as National standards. Training received through the CALJAC programs has equivalent recognition under the CFM California Fire Service Training and Education system. Firefighter apprentices are eligible for Firefighter I certification after completing an initial 400 hour academy and gaining the appropriate experience.

In 1988, the Federal government approved National Standards for the CALJAC allowing Federal fire agencies to participate as well.

In-house training is recognized as one of the best ways to achieve the objectives of this firefighter apprenticeship training. To participate in CALJAC, each fire department would need to make apprenticeship training available to all trainees; provide all related and supplemental instruction; provide classrooms, instructors, drill grounds, A-V equipment, books and supplies; and designate an instructor of record who holds a designated California subjects teaching credential who oversees the program's operation.

Program funding. MCFD receives CALJAC funding to support part of the costs of basic recruit training -- approximately 10% of the total cost. Through an in-kind contractual relationship with MJC the fire department is able to run the academy through the college. CALJAC reimbursement, while only covering a small part of program costs, does provide some support for equipment. Funding to operate apprenticeship programs comes through a state's educational system. Each participating fire department in California is eligible for reimbursement for apprentice training when its program is recognized as a CALJAC approved apprenticeship training program. Cost-reimbursement is becoming more important to the Santa Ana Fire Department also. The economic incentive is a prime motivator for the department to adopt CALJAC for more levels of training. Similar arrangements for funding exist in most all states.

Standardized curriculum. CALJAC apprenticeship programs encompass 17 different fire service occupations. For Basic Firefighter, 400 academy hours are required; plus 600 related and supplemental hours. CALJAC also provides testing administration support services to each fire agency upon request. Upon completion of an apprenticeship program a transcript is produced for a trainee listing hours and a grade for completion.

College linkages. Many California community colleges award college credit for apprenticeship program completion upon receipt of a CALJAC transcript. A comprehensive technical education is recognized as essential in fire suppression and prevention. The credit award for the apprenticeship offers the firefighter an incentive to complete an Associate Degree. As a three-year apprenticeship, once the basic academy is completed, CALJAC continues to monitor the fire department trainee's overall training program. A fire service program membership advisory board always represents area fire departments at the community college.

A number of specific colleges were also reviewed.

o Modesto Junior College offers an Associate in Science degree in Fire Science. It presently serves approximately 600 students per year in various fire service courses, and graduates approximately 15 students per year. The fire service community served includes 23 agencies within the county, and 30 additional agencies in surrounding areas. College credit is a plus for the MCFD trainee as an Associate Degree is required for advancement in rank as one's career progresses. MJC awards 15 semester hours for

completion of the academy basic training, which represents one quarter of the college degree. An advisory committee consisting of seven fire department chiefs and training officers guides the MJC fire service program. All instructors in the program are adjuncts with the college, and full time fire service personnel.

o College of the Sequoias offers an Associate Degree Fire Science program principally preparing trainees for volunteer service. Using cooperative education with volunteer fire companies, trainees receive "hands-on" credit-bearing training in area fire departments, to compliment technical education. Many of the youthful volunteers come from area high schools.

o Rancho Santiago College serves as the fire service training center for sixteen Orange County (CA) fire departments under the direction of the Orange County Fire Chiefs Association and Orange County Firemen's Association. These departments and organizations have designated the College as the delivery system for the various fire protection instructional programs. The SAFD cooperates with Rancho Santiago Community College in training program delivery. Rancho Santiago College provides eight core classes which are prerequisites to the Academy and Fire Fighter I Certification. These classes also provide 24 units towards an Associates degree in Fire Science Technology. A trainee must successfully complete this core program prior to academy admission. Inclusive are courses in the physical sciences. Santa Ana Fire Department encourages a firefighter to attend college and earn a degree. A three-level Fire Safety Professional Development Program provides bonus dollars

for salaries for college work and other professional kinds of activities completed. Part of the recruitment process is the administration of various admissions and screening tests, which are used for placement and counseling. The NFPA 1001 Physical Agility Tests are also administered. The college provides this as a service to the fire department as part of the cooperative relationship -- a very desirable benefit to the fire department!

Rancho Santiago College's Fire curriculum was developed and is monitored by subject-matter experts representing the fire departments in the consortia. Adjunct instructors are drawn from the various fire departments. SAFD fire service personnel, certified as fire service instructors, serve as adjunct faculty to Rancho Santiago Community College to provide college classes and a basic training academy. Additionally, reserve firefighters are assigned to SAFD stations and companies for practical skills training as part of a mini-academy or pre-apprenticeship program.

o Butte College serves five rural fire departments in the Northern part of California. Butte College offers an Associate in Science degree in Fire Science, and participates in a regional consortium of Fire Service agencies to sponsor a fire academy. Each agency, as well as the college provides funding, equipment, and other resources, including grants (Perkins II) monies to operate the fire training center. The agencies pay for academy training per-participant. Instructors are hired directly by the college. Academy completers earn 20 units of credit towards the AS degree. Cooperative education opportunities in participating fire

departments are also extended to fire science students who are not full-time firefighters. This cooperative education opportunity is especially useful for volunteer firefighters, as Butte College does work in a partnership council arrangement with local high schools. Cooperative education credit is awarded by Butte College in accordance with Federal government guidelines and includes written objectives packages and employer agreements.

o Los Angeles County Fire and Rescue operates an apprenticeship program which is coordinated with the County Regional Occupational Program (ROP). Several community colleges award credit for fire science courses, based on apprenticeship training completed in the ROP. On average, approximately 20 units of college credit can be awarded. LA County Fire and Rescue views the apprenticeship as a financial boost to the Department; approximately 600 apprentices a year are registered in the program. The CALJAC standards specified for the program also help support the framework of LA County Fire's training program.

Other States Have Similar Arrangements

o Connecticut Vocational-Technical College. In Connecticut where a heavy contingent of volunteers are used in the fire service, training is provided by the Connecticut State Fire School and regional training academies. A Fire Science degree program is offered by the Connecticut Vocational-Technical College. The VTC fire science program coordinator is also a commissioner for the State Fire School, thus providing an important communications link between the two programs.

Volunteers seeking degrees at VTC are permitted to apply for and receive credit for fire-related job experiences. These experiences are awarded through adult external college-level experiential programs such as PONSI -- the Program On Non-Standardized Instruction -- a nationally recognized program for life-experiences equating to collegiate credit. Credit is also awarded by the Connecticut VTC for certification programs given by the Connecticut Fire School.

o The City of Akron, Ohio Fire Department also operates an apprenticeship program. It is also operated under the National Program guidelines of the IAFC/IAFF Joint Apprenticeship Program. Akron Fire Department (AFD) also updated this national program to meet current standard changes as well as cross reference the third year apprentice guidebook to their current training materials.

AFD firefighter apprentice personnel are assigned to a line engine company for basic training. They are also expected to select a specific area of interest in which they will become an "expert." Examples of such areas are: driver training, protective clothing, tools and equipment, or hydraulics.

An Apprentice Evaluation Committee was formed to ensure that the training goals are met by each apprentice and the program. The Committee consists of labor (the union) and management. Their function included development of criteria to ensure that each apprentice can demonstrate skills and knowledge proficiency over the three and one/half year program.

AFD conducts the entire program in-house, using their instructors who have been trained as instructors through the Ohio Fire Academy Fire Instructor courses as well as college level educational courses. AFD recruits new firefighter personnel in cooperation with the University of Akron and other collegiate fire science programs. They have found this source of college trained personnel a benefit as all new firefighters must also be trained as a paramedic.

How the Programs are Developed: The Community College

Cooperative apprenticeship program operation with a community college offers some very desirable benefits to the: (1) fire department; (2) firefighters; (3) community; and the college. Cooperative apprenticeship is a way to promote a linkage of higher education and the fire service. Many of tomorrow's skilled occupations will require one to two years of post-secondary eduction over the next decade. Fire Science is one such occupational area. An Associate Degree is a valuable tool for a firefighter's career as well as technical skills development.

Cooperation between the fire service and the community college depends on a quid pro quo -- a mutually beneficial relationship in which the fire department and the college both realize benefits from the cooperation. An increasing number of apprentice programs are being delivered <u>cooperatively</u>, with local community colleges. In California, 62 community colleges offer fire service programs. Many offer cooperative apprenticeship dual-enrollments -- whereby the "hands-on" apprenticeship conducted within the fire department

is both supported and awarded credit by the college towards an Associate degree in Fire Service Technology. The community college is a truly unique American educational institution in this regard.

Apprenticeship Ensures Standards

In times of tight money and budgets, most fire department management are concerned about maintaining the highest standards of training and operations with limited resources. Traditional apprenticeship in the fire service dates back to July of 1975 when the National Apprenticeship and Training Standards for the Firefighter was developed and adopted by the International Association of Fire Chiefs and the International Association of Firefighters, and subsequently certified by the U.S. Department of Labor's Bureau of Apprenticeship and Training. These standards detail the content and operation of an apprenticeship program, and provides minimum guidelines for program development. Minimum guidelines are important. It provides a training management baseline for departmental compliance. It also ensures adequate program funding.

Apprenticeship Ensures Quality Recruitment

To be recognized as a bona fide apprenticeship program a fire department must describe in writing:

- o how apprentices will be recruited and selected;
- o what training the apprentice will receive;
- o the length of the training period; and
- o the wages to be paid the apprentice.

Apprenticeship Builds Quality Training Programs

Apprenticeship is a system of skilled occupational training which combines the learning of performance skills, "on-the-job," and coordinates this with job-related study in the classroom. Thus, work on-the-job and classroom-related instruction reinforce each other, and produce a fully-skilled worker, who knows what to do, how to do it, and why it should be done in a particular way.

Additionally, firefighter apprenticeship programs require a certified instructor of record within the fire department having overall program quality control responsibility. In certain states a valid teaching credential in Fire Science and Fire Service Instructor Certification are also required. This fact alone makes apprenticeship a very desirable method of fire service training; trained and certified instructors ensure better program delivery.

Funding for fire department apprenticeship. Recent Federal legislation has as its objective expanded apprenticeship programs. This legislation provides a means for trimming the cost of training for the fire department through apprenticeship. Also included in the apprenticeship funding arrangement is the new Perkins Technical Education Amendments of 1991 -- which promotes programs called "Tech-Prep," a structured cooperative occupational training arrangement between high schools, community colleges, and business and industry.

Many fire departments already engage in cooperative training: some operate reserve firefighter training programs involving high school age youth; some operate cadet programs for high school age

youth, for high school credit, as highlighted by the District of Columbia Fire Department; and some sponsor volunteer training through community-technical colleges. Many operate registered state department of labor joint apprenticeship programs. These are the kinds of activities defined as Tech-Prep programs.

In Conclusion - A Formula for Success

Apprenticeship provides the fire service some definite benefits. I suggest that a fire department seeking to develop an apprenticeship program do the following:

- Establish a working relationship with a community college to provide "state-of-the-art" training opportunities; if an academy program already exists, use apprenticeship as a means to deliver the "hands-on" portion of the basic training. Establish written agreements specifying each organization's roles and responsibilities.

- Negotiate apprenticeship as a mechanism for training with your labor union. Establish a training trust fund to support the concept. Operate the program jointly.

- Discuss with your state's JAC and the community college how to access more resources (including funding) for the training program as a result of a bona fide apprenticeship program.

- Identify and list the various kinds of resources each of the fire departments and community colleges can bring to an arrangement -- i.e., state certified instructors; training grounds; apparatus and equipment; program funding; recruitment, screening,

and testing services; all valuable contributions to a joint relationship.

Training need not be a burdensome cost to a modern fire department. In fact, it is recognized as a must for community and firefighter safety. Apprenticeship offers a means for training to prescribed industry accepted standards realistically and cost-effectively; providing firefighters with the higher education necessary for tomorrow's fire service leaders.

Chapter 10

Towards a Solution: What has been Learned

This report began by suggesting that the United States is undergoing tremendous changes in its demographic workforce composition; levels of technological complexity in the workplace; and system of workforce training. It has been documented that increasing numbers of occupations are requiring some post-secondary education in order to meet current and future workplace challenges.[1] All of these factors and concerns impact a community's economic well-being.

Federal legislative actions are recognizing these concerns. Perkins II and the pending reauthorization of the Higher Education Act address a need for a triangulation of business, education, and community in partnership for quality workforce development. Apprenticeship continues to surface as a viable means to address workforce training and foster these partnerships.[2]

This study looked at cooperative apprenticeships as a training tool and methodology to assist employers to more effectively staff their workplaces.

Specific research questions posed for the study were:

1. To identify cooperative apprenticeship programs that link employers, industry groups, professional organizations, organized labor, and community groups for job training with the community college.
2. To identify factors that promote these inter-organizational partnerships; and

3. To develop recommendations and guidelines to promote cooperative apprenticeship through partnerships between employers, industry groups, professional organizations, organized labor, community groups and the community college.

Hamilton describes an American style apprenticeship system which involves linkages of the entire community. Like Hamilton's visualization of an American system of apprenticeship, total community involvement is essential to the ultimate success of cooperative apprenticeship as a viable training methodology.

The employer system as described earlier has been successful when employers have seen value in proactive training of workers. Carefully planned agreements have been devised and implemented through which employers, business groups, and professional associations provide the necessary training and employment opportunities to make cooperative apprenticeship work.

Likewise, the community college has successfully offered courses and programs and appropriate credit for the apprenticeship portions of the training. Community colleges have also provided many very desirable ancillary services such as trainee recruitment, testing, certification and job placement upon program completion.

The ultimate benefit of cooperative apprenticeship is community economic development. Cooperative apprenticeship permits trainees to work and earn -- a necessary component for those who need to support themselves as they learn a skill. Cooperative

apprenticeship also stimulates business growth as firms can better plan and develop tomorrow's workforce.

Successful Cooperative Apprenticeship Programs

Collaboration appears to be the key to successful apprenticeship program development. This study identified and reviewed several successful cooperative apprenticeship programs. Cooperative apprenticeship is proven to be more than a training tool or system. As suggested earlier, it is a mechanism for bringing together, in a planned and cohesive manner, all of the human and capital resources within a community (i.e., business, civic, and political) to solve education and training needs, and simultaneously act as a catalyst to foster economic development partnerships. The following pages describe what has been found to work, and why, and how the successful elements of cooperative apprenticeship can be replicated elsewhere by employers, industry groups, professional organizations, organized labor, and community groups in partnership with local community colleges.

The automotive industry. Within the automotive industry, it has been found that both profit making interests and a need to contribute back to the community is a prime motivator for collaboration with the college. The automotive industry includes manufacturers, both domestic and import. The study identified almost a dozen major firms having formal cooperative apprenticeship programs. Another source of motivation was a desire on the part of Automotive industry leaders to train todays and tomorrow's

technicians to a high technology state-of-the-art knowledge and skills level in automotive servicing. Most automotive manufacturers realize that to maintain customer satisfaction as well as a dependable motor vehicle, service technicians need to be trained to a high level of technical ability. An automotive technician needs the level of education commensurate with a two-year college degree. However, the technician needs more than a knowledge of vehicle repair -- this person needs communications and problem-solving abilities -- and the ability to continually self-educate. These are the reasons for joining forces with the community college into a training partnership.

Concurrent with attaining a broader liberal education, these manufacturers recognize a need for technical education in a more real environment where a technician can see what the job is really like. Hence, a cooperative learning experience on-the-job, taught and supervised by master craftsmen (as mentors per Hamilton's model) -- through the apprenticeship. For this experience, the manufacturer turns to the dealer. The dealership community provides cooperative employment opportunities. All of the manufacturers sponsoring programs have their own standardized programs of study detailing the specificity of hands-on work, related technical instruction, and college courses required for their two-year degree program. They all have corporate field coordinators to oversee the program's operation both nationally and locally.

The college realizes a quid pro quo from such arrangements. First, close liaison and participation from industry makes for stronger academic program delivery. Dealers as well as manufacturers are represented on the community college advisory committees for the automotive programs to articulate goals and concerns, mediate conflicts, and direct their programs. In the automotive industry, curriculum development is a joint effort between the college and employer. Again cooperative apprenticeship permits a student to work and earn -- a necessity for many community college students today. In fact, many manufacturers and dealers also have scholarship programs available. Many also sponsor secondary education 2+2 tech-prep programs. Community colleges have amply benefitted from facility development grants, instructor training by the car companies, vehicle and component donations, and assistance in community interface for student recruitment through industry associations and community groups. Community colleges have seen a very respectable enrollment in these cooperative programs as students realize real job opportunities.

Hence, as seen in the automotive industry, collaboration is the key to successful apprenticeship program development. Why then do employers, professional associations, labor organizations, industry groups, community organizations and colleges collaborate? This study has supported the earlier hypothesis that organizations collaborate because:

1. they derive mutual exchanges from each other;
2. their access to external funds are increased;
3. they develop a formal agreement;
4. they assist each other in mediating conflicts.

Partnerships Derive Mutual Exchanges

Like in the automotive industry, employers in many industries and colleges mutually gain through cooperative apprenticeship. For the employer these gains include increased access to training facility space including better classrooms. In turn the automotive manufacturers provided donations to colleges to upgrade labs and classrooms. Construction and fire service industries, and unions also participate by providing equipment, training grounds, models and mock-ups for program use.

Fire departments and the unions cooperatively provide training academy classrooms, apparatus, and access to specialized equipment, etc., to support the various fire science degree programs at the college. In turn the community college also provides ancillary services for the employer and union, including employee training, job recruitment, screening and testing. In the case of the firefighter this includes physical agility testing, psychological batteries, and certification-qualification after basic training academy completion. As a result unions have realized the benefits of a better educated union member, who is better able to function in the workplace.

Gains also include access to high technology education and training and a necessary general education for firefighters, construction workers, and electricians alike. Apprenticeship trainees master new technology and earn academic college credit for their participation in these various programs, which are often taught by their own (union's) master-craftsmen. One IUOE union apprenticeship coordinator related that "...a decade ago it was hard to find a machinist with a knowledge of numerical control machines (or sic) an electrician with a knowledge of microprocessor or fiber optics...."[3] As a result of partnerships with community colleges, apprentices are now afforded these kinds of skills and knowledge which are highly desired by the employer. Likewise, a better trained firefighter and emergency medical technician can serve their public more competently and professionally. Apprenticeship has also involved volunteer organizations such as those in the fire service -- hence a parallel to the Hamilton model calling for volunteer community service apprenticeships.

Access to External Funds

All training programs consume significant monies in times of tight budgets. Often paybacks are long in coming and not readily measurable by an employer. The funding of an apprenticeship training program is no simple matter. In the automotive industry, manufacturers have mechanisms to fund these cooperative programs. Many also provide scholarships for trainees. Dealers pay their apprentices competitive wages. Where regulated by a state

department of labor, th ges will increase with the hours of training completed.

The construction and electrical union and firefighter programs operate under the joint apprenticeship committee (JAC) control. Employers are compensated in part by the JAC for the costs of training. Hence, a benefit of apprenticeship is a cost-sharing in the expenses incurred with employee development.

Perkins II Vocational Education funds have also been accessed by these cooperative ventures in several of the automotive, firefighter, and union-sponsored programs -- but not to its maximum level. Hamilton suggests that, "apprenticeship is a natural extension of secondary vocational education that bridges school and work."[4] More dialogue is needed between business and industry and union apprentice coordinators with community college personnel to explore these various funding opportunities. This revenue source makes it more desirable for business (as well as organized labor) and community colleges to cooperate for apprenticeship training.

Within the automotive industry, the funding arrangements usually center around a local non-profit foundation (a 501(c)3 corporation) -- (e.g., the Seattle King County (WA) Automotive Trades Foundation). In the maritime industry, a 501(c)3 foundation also exists in the Tidewater Virginia area. The foundation funding concept enables these various organizations to focus their program and fiduciary efforts in a common direction and towards a common

set of goals. This focus, in turn, enables a "single voice" to emerge in problem solution, publicity, and other interorganizational kinds of activities.

Formal Agreements and Contracts

Cooperative apprenticeship partnerships require formal written arrangements of some kind. Collaborating organizations are usually formally bound through contractual agreements, or as a result of the legal arrangement itself (e.g., a partnership arrangement). The JAC offers an organizational structure. A JAC has an employment and training committee, representatives of labor, representatives of apprentices, employers and sometimes also state or local representatives. This becomes important in formalizing the cooperative apprenticeship process. The JAC apprenticeship written agreement between the employer, the union, and the community college as a contract training agency serves as a written contract between all parties in the construction and firefighter industries.

Formal contracts are in place in most of the programs reviewed. The automotive manufacturers all have contractual arrangements with colleges, detailing mutual responsibilities and standards of program operation. Once engaged in cooperative apprenticeship relationships with a college, some of the automotive manufacturers then use the college as a contract training site for advanced or update training of their dealership personnel -- hence a regional training center for the manufacturer. The funds

received provide general college operating budget sources of revenue.

The Local #3 program has by far, the most formal arrangements of the various union programs reviewed. It serves as a model for other union-based programs. IUOE programs also have some form of written agreement for credit award; faculty use; instructor compensation; etc. Formal agreements are important for program continuity and for communications -- hence a mutual understanding of roles and responsibilities.

The automotive manufacturers view cooperative apprenticeship training as a venture which has its genesis in secondary Vocational Education. They provide opportunities for 2+2 Tech Prep arrangements involving high school programs and participating colleges.

Often, as in the case of Harford Community College, the community college's mission statement sets a tone and/or provides an impetus for such a business partnership kind of action. In any event, a formal agreement is necessary to facilitate the collaborative effort.

Cooperative Apprenticeship Partnerships Can Mediate Conflicts

Apprenticeship has traditionally provided a mechanism for organized labor and employer-contractors to jointly control and monitor employee training and development. In recent years it also has provided a way to control, to some degree, technological changes in the workplace through a phase-in process with employee

retirement and replacement. The cooperative apprenticeship serves as a mechanism for businesses and communities alike to use the community college as a training resource, economic development catalyst, and source of technical advise and consultation. However, to do so, all partners must alleviate barriers through communication.

In each of the cases studied, certain specific configurations emerged as catalysts to drive the arrangement. The use of the Joint Industry Board, as demonstrated by IBEW Local #3, and the California JAC for Firefighters have proven successful in this regard. Whenever differences of opinion regarding the kinds of training, numbers of trainees entering the programs, or other substantive issues emerge, these communication configuration mechanisms assist in mediating the conflict. Also as a training ground for tomorrow's business and union leaders, apprentice participation on these committees also provides the experience in mediation and problem-solution formulation.

A Cooperative Apprenticeship Model Emerges

This study produced new information which now can be discussed as recommendations and guidelines to promote cooperative apprenticeship partnerships between industry groups, employers, professional organizations, organized labor, and the community college. The following recommendations compliment Hamilton's model for an American system of apprenticeship (see Figure 10-1).

Insert Figure 10-1 about here

Apprenticeship is more than a training tool. It is a potential mechanism for bringing together, in a planned and cohesive manner, the human and capital resources, within a community (business, civic and political), to solve human resource education and training needs. As an added benefit, it acts as a catalyst to improve a firm's and union's strength and posture; and to foster partnerships for training and economic development.

Communication for Mutual Exchanges

Apprenticeship program development begins with communication. First, employers must ascertain their specific needs for training which can be provided by a community college. Colleges can assist in this effort by offering assistance to businesses and business groups in the form of suggestions for training programs where indicated. Industry employers, (and unions) and the college should mutually understand what skills and education they wish trainees to acquire. Can these skills and knowledge be gained through community college cooperative apprenticeship training programs? Is there a benefit to pooling resources for training? Information concerning resources (e.g., facilities, equipment, funding) which are needed for training and that can be shared or otherwise made available should be clarified. And of course availability of cooperative employment opportunities for on-the-job training must

be made and discussed. Employers should consider providing ample "state-of-the-art" training opportunities for existing as well as future labor needs. A certain allocation of entry-level employees should be planned for and maintained in firms for proactive manpower development and economic/business growth. If a training program within a firm already exists, firms can consider using apprenticeship as a means to deliver the "hands-on" portion of the basic training.

Organizing for Funding and Program Development

Per Figure 10-2, business and industry's involvement in program development should commence with the formation of groups or councils (e.g., automotive trades foundation) to facilitate communication with the college as well as program delivery. Often it is easier for a college to work with a group rather than individual employers on activities such as apprenticeship programs. However, it is essential to have written agreements specifying each participating organization's roles and responsibilities. Identify and list the various kinds of resources each of the participating firms and community colleges can bring to an arrangement -- i.e., state certified instructors; training facilities or grounds; apparatus and equipment; program funding; recruitment, screening, and testing services; all valuable contributions to a joint relationship. Additional information which should be put into writing includes procedures for recruitment, testing, and cooperative apprenticeship placement and evaluation.

Funding. The written agreement should also provide mechanisms for funding the program as well as the trainee's tuition at the college. Oftentimes a participating firm will cover the costs associated with the apprenticeship itself, but require the trainee to bear the burden of the additional college work. The college should assist the trainee with financial aid opportunities to meet whatever financial shortfalls exist on a student by student basis.

Insert Figure 10-2 about here

Labor's role. Where union representation exists as part of the employer-employee arrangement, the union should explore the use of a joint apprenticeship committee as a mechanism for coordinating and administering the apprenticeship with the college. Funding through the JAC should also be discussed -- including the procedures to access State/Federal support for the program.

The community college can assist with procedures to deliver the program -- off-site locations if necessary for course/classroom work; instructor recruitment and training; award of credit for hands-on-work (e.g., use of PONSI; credit by exam); financial aid or tuition assistance; department of labor registration (if desired) and FTE reimbursement for dual-enrollment of trainees.

Program development. While many industries have established apprenticeship training guidelines (e.g., firefighters; automotive manufacturers; electrical workers), when a firm or industry does

not have such guidelines, the college can assist with the research and development work necessary to either develop or identify appropriate guidelines to guide delivery of cooperative apprenticeship programs. Numerous such documents exist in the public domain -- and through the state/Federal departments of labor.

Conflict Resolutions

Structures and organizations as described herein permit easy and fruitful conflict resolution. When goals are mutually agreed upon, and roles and responsibilities are clear and understood, conflicts can be negotiated and overcome to everyone's satisfaction.

In Closing...

Dual-enrollment of apprentices in Associate Degree Programs is a practice which must be promoted. It has proven to be the most cost - effective mechanism for organized labor to provide worker training, and to control its ultimate delivery and quality. It further guarantees continued worker participation in the organized labor movement into the 21st century.

Figure Caption

Figure 10-1. A model for job training and economic development.

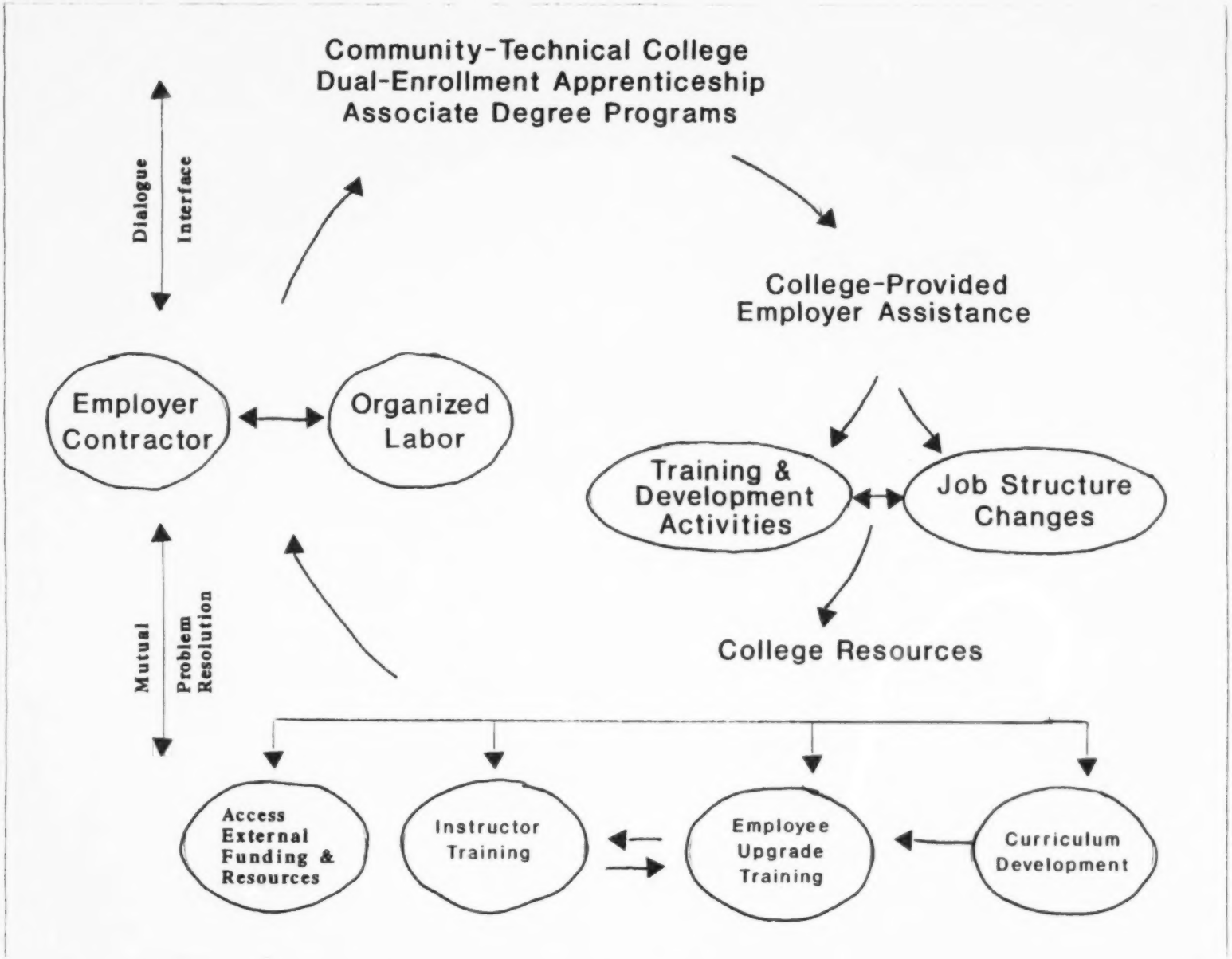
Community-Technical College
Dual-Enrollment Apprenticeship
Associate Degree Programs
Dialogue
Interface
College-Provided
Employer Assistance
Employer
Contractor
Organized
Labor
Training &
Development
Activities
Job Structure
Changes
Mutual
Problem
Resolution
College Resources
Access
External
Funding &
Resources
Instructor
Training
Employee
Upgrade
Training
Curriculum
Development

Figure Caption

Figure 10-2. The three forces affecting business-community college partnerships for cooperative apprenticeship training.

	A NEED	Activities for Potential Solutions
ORGANIZED LABOR	- To maintain worker confidence & membership - To be involved in worker training & development	- build employer -labor relation-ships for training & development - provide worker educational opportunities for career advancement
BUSINESS- THE EMPLOYER	- To obtain skilled workers - To control costs of training - Keep worker skills keen & current	- build employer-labor relationships for training & development - obtain appropriate technological training & consultation - share costs of training
COMMUNITY COLLEGES	- To be involved in human resource development in the business community - To provide training for existing jobs for students	- provide degree programs to meet business & industry needs - Articulate with business & the community to develop programs consistent with economic development goals - develop structured workplace learning instructional strategies--i.e., apprenticeship
THE COMMUNITY	- To provide a base of skilled labor - To promote business & industry's goals for growth & development - To provide good jobs for its citizens	- build partnerships & alliances of business, labor, & community colleges

The Three Forces Affecting Business-Community College Partnerships For Cooperative Apprenticeship Training

Endnotes

1. see: Johnston, W.B. & Packer A.E. (1987). Workforce 2000: Work and workers for the 21st century. Indianapolis, IN: Hudson Institute.

2. see: Hamilton, S.F. (1990). Apprenticeship for adulthood. Preparing youth for the future. New York: The Free Press.

3. Hamilton, S.F. (1990), ibid.

4. Hamilton, S.F. (1990), ibid, 158.

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